THE

L O G I C

OF

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REDUCED AND PREPARED FOR USE IN COLLEGES AND SCHOOLS,

BY

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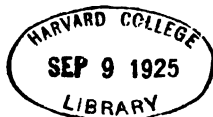
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METHODOLOGY.

PREFACE.

Logic claims to be the Science *of all our* Knowing—*ars artium, et scientia scientiarum.* It was in former ages so regarded; and no systematic and thorough education was thought possible but as Logic was made its support and center. It has, of late, been nearly banished from our seats of learning. The reason of this is doubtless to be found in the fact that all accessible systems of Logic had lost nearly all their scientific character. They had become partial, one-sided expositions, and pervaded with error. The Lectures of Sir William Hamilton have, to a great extent at least, supplied these fatal defects and given us a system full and complete, and in most admirable method. His "New Analytic" marks an era in the progress of abstract science; and in this new form, Logic is in its own right restored to the high commanding position and rank to which it has laid claim in all truly liberal education. Whether we regard the relation of Logic to all other sciences, as the foundation and determining form in the structure in all, or its own intrinsic fitness as instrument of mental discipline, we must admit its indispensable importance in all intellectual culture. Its indispensableness in training to power in presenting thought, in the acquisition of skill in dealing with thought so as to communicate it in discourse effectively, whether in mere explanation or in argumentation, but specially in explanation, will be

questioned by none who have made trial of it in self-
training, or in the education of others.

A form of the new Analytic that could be admitted
into our higher seminaries of learning, seemed thus
to be a desideratum of pressing urgency, inasmuch as
the Lectures were in divers respects ill-adapted to this
use. The extended recapitulations, often presenting
the matter from new points of view, thus distracting
as well as overloading the mind of the learner, and
the more extended historical criticisms, for which the
novice in the science is all unprepared, and which,
moreover, much of it, is of interest only to the anti-
quarian, are well nigh insurmountable obstacles to
their general introduction into our literary institu-
tions; at the same time it was eminently desirable
to bring the mind of the pupil into immediate contact
with the acuteness, the learning, the perfect method
of this great philosopher. On examination, and after
successive trials with classes marked by decided suc-
cess, it has seemed possible merely by a process of
excision, to leave the system in unimpaired method
and connection while yet bringing it within the cir-
cumscription of a College Text-Book.

This, accordingly, is what has been undertaken in
the preparation of the present volume. The whole
of the department of " Modified Logic," which Ham-
ilton himself teaches us he has admitted " under
protest " as no part of Logic as a pure science, both
as it stands by itself as a coördinate department with
pure Logic and also as it is anticipated in the body of
this last named department, together with the Appen-
dix, consisting of Fragmentary Notes, making up not
far from one-half of the whole formidable volume of

the Lectures, and also the Recapitulations and Histori-
cal Criticisms everywhere interwoven into the work,
have been omitted. Much irrelevant matter appro-
priate to the Lecture, but not so necessary or so befit-
ting to the Text-Book, has also been excluded. What
remains makes up a compact and yet complete body
of science, and all in the phraseology of Sir William
Hamilton. A portion of the matter has been removed
from the body of the work to an Appendix.

But the Lectures, as an exposition of Logical sci-
ence, were by no means free from defect. Sir Wil-
liam Hamilton himself has indicated some of the
improvements he had discovered as desirable in the
science, as a system, in his Discussions and the Frag-
mentary Notes published by his Editors. To supply
this want, the present Editor has inserted in para-
graphs indicated by brackets, what he has deemed desir-
able in these improvements, and yet compatible with
the integrity of form in which the system still appears.
The more important of these additions are, The Enu-
meration of the Wholes with which Logic should
be conversant; The Division of Judgments; The
Division of Reasonings into Mediate and Immediate;
and The Nature of Inductive Reasoning.

The department of Methodology is left by Sir
William Hamilton in a form that appears to the
present Editor very unsatisfactory. But as this topic
may with as much philosophical propriety be treated
in a system of Rhetoric, he has on reflection abandoned
his first intention to modify the form in which it
appears in the Lectures, which is, after all, mainly but
a translation from German treatises, and presenting
the topic here as it was left by Sir William Hamilton,

has reserved the discussion of this most important part of Logic to be presented in more practical and applied forms in his Art of Rhetoric, now in preparation. In his Elements of this Art, first published in 1850, it is presented in its leading outlines, and also in his Rhetorical Praxis, first published in 1860, in a form still more exactly adapted for use and practical application, but in both cases from a Rhetorical point of view.

COLLEGE HILL,
        CINCINNATI, *July*, 1863.

INTRODUCTION.

I.—DEFINITION OF LOGIC.

¶ I. A SYSTEM of Logical Instruction consists of Two

I. Of what a system of Logic consists. Parts—1°. Of an Introduction to the Science; 2°. Of a Body of Doctrine constituting the Science itself.

¶ II. The Introduction to Logic should afford answers to

II. The Introduction to Logic. the following questions: i. What is Logic? ii. What is its Value? iii. What are its Divisions? iv. What is its History? and, v. What is its Bibliography, that is, what are the best books upon the subject?

III. Definition of Logic. ¶ III. What is Logic? *Answer*—Logic is the Science of the Laws of Thought as Thought.

Its derivation and meaning. It is derived from λόγος, and it had primarily the same latitude and variety of signification as its original. What, then, did λόγος signify? In Greek, this word had a twofold meaning. It denoted both thought and its expression; it was equivalent both to the *ratio* and to the *oratio* of the Latins. The Greeks, in order to obviate the ambiguity thus arising from the confusion of two different things under one expression, were compelled to add a differential epithet to the common term.

How expressed by Aristotle. Aristotle, to contradistinguish λόγος, meaning *thought*, from λόγος, meaning *speech*, calls the former τὸν ἔσω—τὸν ἐν τῇ ψυχῇ—*that within—that in*

(9)

the mind; and the latter, τὸν ἔξω—*that without.* The same

distinction came subsequently to be expressed by the λόγος ἐνδιάθετος, for *thought,* the *verbum mentis;* and by λόγος προφορικὸς, for *language,* the *verbum oris.*

It was a point long keenly mooted by the old logicians, whether Logic were a science, or an art, or neither, or both; and if a science, whether a science practical, or a science speculative, or at once specula-

tive and practical. Plato and the Platonists viewed it as a science; but with them Dialectic, as I have noticed, was coëxtensive with the Logic and Metaphysics of the Peripatetics taken together. By Aristotle himself, Logic is not defined. The Greek Aristotelians, and many philosophers since the revival of letters, deny it to be either science or art. The Stoics, in general, viewed it as a science; and the same was done by the Arabian and Latin schoolmen. In more modern times, however, many Aristotelians, all the Ramists, and a majority of the Cartesians, maintained it to be an art; but a considerable party were found who defined it as both art and science. In Germany, since the time of Leibnitz, Logic has been almost universally regarded as a science.

The controversy which has been waged on this point is perhaps one of the most futile in the history of speculation. In so far as Logic is concerned, the decision of the question is not of the very smallest import. It was not in consequence of any diversity of opinion in regard to the scope and nature of this doctrine, that philosophers disputed by what name it should be called. The controversy was, in fact, only about what was properly an art, and what was properly a science; and as men attached one meaning or another to these terms, so did they affirm Logic to be an art, or a science, or both, or neither.

I am well aware that it would be no easy matter to give a general definition of science, as contradistinguished from art,

and of art, as contradistinguished from science; but if the words themselves can not validly be discriminated, it would be absurd to attempt to discriminate anything by them. When I, therefore, define Logic by the genus *science*, I do not attempt to give it more than the general denomination of a branch of knowledge; for I reserve the discrimination of its peculiar character to the differential quality afforded by its object-matter. You will find, when we have discussed the third head of the definition, that Logic is not only a science, but a demonstrative or apodictic science: but so to have defined it, would have been tautological; for a science conversant about laws is conversant about necessary matter, and a science conversant about necessary matter is demonstrative.

I proceed to explain to you what is meant by the object-
2. Logic—Its object-matter. matter of Logic—viz., the Laws of Thought as Thought. The consideration of this head naturally divides itself into three questions: 1. What is Thought? 2. What is Thought as Thought? 3. What are the Laws of Thought as Thought?

In the first place, then, in saying that Logic is conversant
(a) Thought—what. about Thought, we mean to say that it is conversant about thought strictly so called. The term *thought* is used in two significations of different
In its wider and narrower meaning. extent. In the wider meaning, it denotes every cognitive act whatever; by some philosophers, as Descartes and his disciples, it is even used for every mental modification of which we are conscious, and thus includes the Feelings, the Volitions, and the Desires. In the more·limited meaning, it denotes only the acts of the Understanding properly so called, that is, of the Faculty of Comparison, or that which is distinguished as the Elaborative or Discursive Faculty. It is in this more restricted significa-
Objects that lie beyond the sphere of Logic. tion that thought is said to be the object-matter of Logic. Thus Logic does not consider the laws which regulate the other powers of mind. It takes no immediate account of the faculties

by which we acquire the rude materials of knowledge; it supposes these materials in possession, and considers only the manner of their elaboration. It takes no account, at least in the department of Pure Logic, of Memory and Imagination, or of the blind laws of Association, but confines its attention to connections regulated by the laws of intelligence. Finally, it does not consider the laws themselves of Intelligence as given in the Regulative Faculty—Intelligence—Common Sense; for in that faculty these laws are data, facts, ultimate and, consequently, inconceivable; but whatever transcends the sphere of the conceivable, transcends the sphere of Logic.

Such are the functions about which Logic is not conversant, and such, in the limited signification of the word, are the acts which are not denominated Thought. We have hitherto found what thought is not; we must now endeavor to determine generally what it is.

The contemplation of the world presents to our subsidiary faculties a multitude of objects. These objects are the rude materials submitted

Thought proper.

to elaboration by a higher and self-active faculty, which operates upon them in obedience to certain laws, and in conformity to certain ends. The operation of this faculty is Thought. All thought is a comparison, a recognition of similarity or difference; a conjunction or disjunction; in other words, a synthesis or analysis of its objects. In Conception, that is, in the formation of concepts (or general notions), it compares, disjoins, or conjoins concepts; in Reasoning, it compares, disjoins, or conjoins judgments. In each step of this process there is one essential element; to think, to compare, to conjoin, or disjoin, it is necessary to recognize one thing through or under another; and therefore, in defining Thought proper, we may either define it as an act of Comparison, or as a recognition of one notion as in or under another. It is in performing this act of thinking a thing under a general notion, that we are said to understand or comprehend it. For example: an object is presented, say a book; this object determines

an impression, and I am even conscious of the impression, but without recognizing to myself what the thing is; in that case, there is only a perception, and not properly a thought. But suppose I do recognize it for what it is, in other words compare it with, and reduce it under, a certain concept, class, or complement of attributes, which I call *book ;* in that case, there is more than a perception—there is a thought.

All this will, however, be fully explained to you in the sequel ; at present I only attempt to give you a rude notion of what thinking is, to the end that you may be able vaguely to comprehend the limitation of Logic to a certain department of our cognitive functions, and what is meant by saying that Logic is a science of thought.

But Thought simply is still too undetermined ; the proper (b) Thought as thought object of Logic is something still more defin- —what. ite ; it is not thought in general, but thought considered merely as thought, of which this science takes cognizance. This expression requires explanation ; we come therefore to the second question—What is meant by Thought as Thought ?

To answer this question, let us remember what has just been said of the act constitutive of thought—viz., that it is the recognition of a thing as coming under a concept ; in other words, the marking an object by an attribute or attributes previously known as common to sundry objects, and to which we have accordingly given a general name. In this process we are able, by abstraction, to distinguish from each other—1°. Matter and Form of The object thought of ; and, 2°. The kind Thought. and manner of thinking it. Let us, employing the old and established technical expressions, call the first of these the *matter*, the second the *form* of the thought. For example, when I think that the book before me is a folio, the matter of this thought is book and folio ; the form of it is a judgment. Now, it is abundantly evident that this analysis of thought into two phases or sides is only the work of a scientific discrimination and contrast ; for as, on the one hand, the

matter of which we think is only cogitable through a certain
form, so, on the other, the form under which we think can not
be realized in consciousness, unless in actual application to an
object. Now, when I said that Logic was
conversant about thought considered merely
as thought, I meant simply to say, that
Logic is conversant with the form of thought, to the exclusion
of the matter. This being understood, I now proceed to show
how Logic only proposes, how Logic only can propose, the
form of thought for its object of consideration. It is indeed
true, that this limitation of Logic to the form of thought has
not always been kept steadily in view by logicians; that it is
only gradually that proper views of the science have been
speculatively adopted, and still more gradually that they have
been carried practically into effect, insomuch that to the pres-
ent hour, there are sundry doctrines still taught as logical,
which, as relative to the matter of thought, are in fact foreign
to the science of its form.

*Logic properly con-
versant only with the
Form of Thought.*

But although it is impossible to show by the history of the
science, that Logic is conversant with the form,
to the exclusion of the matter, of thought; this
can, however, be satisfactorily done by a con-
sideration of the nature and conditions of
the thing itself. For, if it be maintained that Logic takes not
merely the form, but the matter of thought into account (the
matter, you will recollect, is a collective expression for the
several objects about which thought is conversant), in that
case, Logic must either consider all those objects without dis-
tinction, or make a selection of some alone. Now the former
of these alternatives is manifestly impossible ; .for if it were
required that Logic should comprise a full discussion of all
cogitable objects—in other words, if Logic must draw within
its sphere all other sciences, and thus constitute itself in fact
the one universal science—every one at once perceives the
absurdity of the requisition, and the impossibility of its ful-
fillment. But is the second alternative more reasonable ? Can

*This shown by a con-
sideration of the na-
ture and conditions of
the thing itself.*

it be proposed to Logic to take cognizance of certain objects of thought to the exclusion of others? On this supposition, it must be shown why Logic should consider this particular object, and not also that; but as none but an arbitrary answer, that is, no answer at all, can be given to this interrogation, the absurdity of this alternative is no less manifest than that of the other. The particular objects, or the matter of thought, being thus excluded, the form of human thought alone remains as the object-matter of our science; in other words, Logic has only to do with thinking as thinking, and has no, at least no immediate, concernment with that which is thought about. Logic thus obtains, in common parlance, the appellation of a formal science, not indeed in the sense as if Logic had only a form and not an object, but simply because the form of human thought is the object of Logic; so that the title *formal science* is properly only an abbreviated expression.

I proceed now to the third question under this head, viz., (c) The Laws of Thought as Thought. What is meant by the Laws of Thought as Thought? in other words, What is meant by the Formal Laws of Thought?

We have already limited the object of Logic to the form of thought. But there is still required a last and final limitation; for this form contains more than Logic can legitimately consider. Human thought, regarded merely in its formal relation, may be considered in a twofold point of view; for, on the one hand, it is either known to us merely from experience or observation, we are merely aware of its phenomena historically or empirically, or, on the other, by a reflective speculation, by analysis and abstraction, we seek out and discriminate in the manifestations of thought what is contained of necessary and universal. The empirical or historical consideration of our thinking faculty does not belong to Logic, but to the Phenomenology of Mind, to Psychology. The empirical observation of the phenomena necessarily, indeed, precedes their speculative analysis. But, notwithstanding this, Logic possesses a peculiar province of its own, and constitutes an

independent and exclusive science. For where our empirical consideration of the mind terminates, there our speculative consideration commences; the necessary elements which the latter secures from the contingent materials of observation—these are what constitute the laws of thought as thought.

Now, when we say that Logic is the science of the necessary forms of thought, what does the quality of necessity here imply.

Form of thought.— Four conditions of its necessity.

1. Determined by the nature of the thinking subject itself.

In the first place, it is evident that in so far as a form of thought is necessary, this form must be determined or necessitated by the nature of the thinking subject itself; for if it were determined by anything external to the mind, then would it not be a necessary, but a merely contingent determination. The first condition, therefore, of the necessity of a form of thought is, that it is subjectively, not objectively, determined.

2. Original.

In the second place, if a form of thought be subjectively necessary, it must be original and not acquired. For if it were acquired, there must have been a time when it did not exist; but if it did ever actually not exist, we must be able at least to conceive the possibility of its not existing now. But if we are so able, then is the form not necessary; for the criterion of a contingent cognition is, that we can represent to ourselves the possibility of its non-existence. The second condition, therefore, of the necessity of a form of thought is, that it is original, and not acquired.

3. Universal.

In the third place, if a form of thought be necessary and original, it must be universal; that is, it can not be that it necessitates on some occasions, and does not necessitate on others. For if it did not necessitate universally, then would its necessitation be contingent, and it would consequently not be an original and necessary principle of mind. The third condition, therefore, of the necessity of a form of thought is, that it is universal.

In the fourth place, if a form of thought be necessary and universal, it must be a law ; for a law is that which applies to all cases without exception, and from which a deviation is ever, and everywhere, impossible, or at least, unallowed. The fourth and last condition, therefore, of the necessity of a form of thought is, that it is a law. This last condition, likewise, enables us to give the most explicit enunciation of the object-matter of Logic, in saying that Logic is the science of the Laws of Thought as Thought, or the science of the Formal Laws of Thought, or the science of the Laws of the Form of Thought ; for all these are merely various expressions of the same thing.

4. A Law.

The Object-matter of Logic explicitly enounced.

Logic, we have seen, is exclusively conversant about thought, about thought considered strictly as the operation of Comparison, or the faculty of Relations ; and thought, in this restricted signification, is the cognition of any mental object by another in which it is considered as included ; in other words, thought is the knowledge of things under conceptions. By the way, I would here pause to make an observation upon the word *conception*, and to prepare you for the employment of a term which I mean hereafter to adopt. You are aware, from what I have already said, that I do not use *conception* in the signification in which it is applied by Mr. Stewart. He usurps it in a very limited meaning, in a meaning which is peculiar to himself, viz., for the simple and unmodified representation of an object presented in Perception. Reid, again, vacillates in the signification he attaches to this term, using it sometimes as a synonym for imagination, sometimes as comprehending not only Imagination, but Understanding and the object of Understanding. It is in the latter relation alone that I ever employ it, and this is its correct and genuine signification, whether we regard the derivation of the word, or its general use by philosophers. *Conception*, in English, is equivalent to *conceptio* and *conceptus* in Latin ; and these terms, by the best

The terms Conception and Concept.

Author's employment of these terms.

2

philosophers, and the most extensive schools, have been employed as synonymous for *notion* (*notio*), the act or object of the Understanding Proper, or Faculty of Relations. So far, therefore, you are sufficiently prepared not to attribute to the word *conception*, when you hear it from me, the meaning which it bears in the philosophical writings with which you are most likely to be familiar. What is the precise meaning of the term will soon be fully explained in its proper place, when we commence the treatment of Logic itself. But what I principally pause at present to say is—that, for the sake of perspicuity, I think it necessary, in reference to this word, to make the following distinction. The term *conception*, like *perception*, *imagination*, etc., means two things, or rather the same thing in two different relations—relations, however, which it is of great importance to distinguish, and to mark the distinction by the employment of distinct words. *Conception* means both the act of conceiving, and the object conceived; as *perception*, both the act of perceiving, and the thing perceived; *imagination*, both the act of imagining, and what is imagined. Now, this is a source of great vagueness in our philosophical discussions: have we no means of avoiding this inconvenience? I think we have; and that, too, without committing any violence upon language. I would propose the following distinction: For the act of conceiving, the term *conception* should be employed, and that exclusively; while for the object of conception, or that which is conceived, the term *concept* should be used. Concept is the English of the Latin *conceptum*—*id quod conceptum est*—and had it no vested right as an actual denizen of the language, it has good warrant for its naturalization. There are a thousand words in English formed on precisely the same analogy, as *precept*, *digest*, etc., etc. But we have no occasion to appeal to analogy. The term *concept* was in common use among the older philosophical writers in English, though, like many other valuable expressions of these authors, it has been overlooked by our English lexicographers. I may add, that nearly the same fortune has befallen the

term in French. *Concept* was in ordinary use by the old French philosophers, but had latterly waxed obsolete. It has, however, I see, been reinstated in its rights since the reäwakening of philosophy in France; and, in that particular, it is now employed in that language in translating from the German the term *Begriff*. I shall, therefore, make no scruple in using the expression *concept* for the object of conception, and *conception* I shall exclusively employ to designate the act of conceiving. Whether it might not, in like manner, be proper to introduce the term *percept* for the object of perception, I shall not at present inquire.

But to return from this digression. Logic, we have seen, is

Analogy between exclusively conversant about thought strictly
Logic and Mathematics. so denominated, and thought proper, we have
seen, is the cognition of one object of thought by another, in or under which it is mentally included; in other words, thought is the knowledge of a thing through a concept or general notion, or of one notion through another. In thought, all that we think about is considered either as something containing, or as something contained; in other words, every process of thought is only a cognition of the necessary relations of our concepts. This being the case, it need not move our wonder that Logic, within its proper sphere, is of such irrefragable certainty, that, in the midst of all the revolutions of philosophical doctrines, it has stood not only unshattered but unshaken. In this respect, Logic and Mathematics stand alone among the sciences, and their peculiar certainty flows from the same source. Both are conversant about the relations of certain *a priori* forms of intelligence: Mathematics about the necessary forms of Imagination; Logic about the necessary forms of Understanding; Mathematics about the relations of our representations of objects, as out of each other in space and time; Logic about the relations of our concepts of objects, as in or under each other, that is, as, in different relations, respectively containing and contained. Both are thus demonstrative or absolutely certain sciences only as each develops

what is given—what is given as necessary, in the mind itself. The laws of Logic are grounded on the mere possibility of a knowledge through the concepts of the Understanding, and through these we know only by comprehending the many under the one. Concerning the nature of the objects delivered by the Subsidiary Faculties to the Elaborative, Logic pronounces nothing, but restricts its considerations to the laws according to which their agreement or disagreement is affirmed.

It is of itself manifest that every science must obey the laws

Logic is the negative condition of truth. of Logic. If it does not, such pretended science is not founded on reflection, and is only an irrational absurdity. All inference, evolution, concatenation, is conducted on logical principles—principles which are ever valid, ever imperative, ever the same. But an extension of any science through Logic is absolutely impossible; for by conforming to logical canons we acquire no knowledge—receive nothing new, but are only enabled to render what is already obtained more intelligible, by analysis and arrangement. Logic is only the negative condition of truth. To attempt by a mere logical knowledge to amplify a science, is an absurdity as great as if we should attempt by a knowledge of the grammatical laws of a language to discover what was written in this language, without a perusal of the several writings themselves. But though Logic can not extend, can not amplify a science by the discovery of new facts, it is not to be supposed that it does not contribute to the progress of science. The progress of the sciences consists not merely in the accumulation of new matter, but likewise in the detection of the relations subsisting among the materials accumulated ; and the reflective abstraction by which this is effected, must not only follow the laws of Logic, but is most powerfully cultivated by the habits of logical study.

II.—UTILITY OF LOGIC.

¶ IV. As the rules of Logic do not regard the matter but

IV. Utility of Logic. only the form of thought, the Utility of Logic must, in like manner, be viewed as

limited to its influence on our manner of thinking, and not sought for in any effect it can exert upon what we think about. It is, therefore, in the first place, not to be considered useful as a Material Instrument, that is, as a mean of extending our knowledge by the discovery of new truths; but merely as a Formal Instrument, that is, as a mean by which knowledge, already acquired, may be methodized into the form accommodated to the conditions of our understanding. In the second place, it is not to be regarded as a Medicine of the mind to the extent of remedying the various errors which originate in the nature of the objects of our knowledge, but merely to the extent of purging the mind of those errors which arise from inconsequence and confusion in thinking.

Logic, however, is still of eminent utility, not only as presenting to us the most interesting object of contemplation in the mechanism of human thought, but as teaching how, in many relations, to discriminate truth from error, and how to methodize our knowledge into system; while, at the same time, in turning the mind upon itself, it affords to our higher faculties one of their most invigorating exercises. Another utility is, that Logic alone affords us the means requisite to accomplish a rational criticism, and to communicate its results.

Admitting, therefore, that this science teaches nothing new—that it neither extends the boundaries

Logic gives us, to a certain extent, dominion over our thoughts.

of knowledge, nor unfolds the mysteries which lie beyond the compass of the reflective intellect—and that it only investigates the immutable laws to which the mind in thinking is subjected, still, inasmuch as it develops the application of these laws, it bestows on us, to a certain extent, a dominion over our thoughts themselves. And is it nothing to watch the secret workshop in which nature fabricates cognitions and thoughts, and to penetrate into the sanctuary of self-consciousness, to the end that, having learnt to know ourselves, we may be qualified rightly to understand all else? Is it nothing to seize the helm of thought, and to be able to turn it at our will? For, through a research into the

laws of thinking, Logic gives us, in a certain sort, a possession
of the thoughts themselves. It is true, indeed, that the mind
of man is, like the universe of matter, governed by eternal
laws, and follows, even without consciousness, the invariable
canons of its nature. But to know and understand itself, and
out of the boundless chaos of phenomena presented to the
senses to form concepts, through concepts to reduce that chaos
to harmony and arrangement, and thus to establish the domin-
ion of intelligence over the universe of existence—it is this
alone which constitutes man's grand and distinctive preëmi-
nence. "Man," says the great Pascal, "is but a reed—the
very frailest in nature ; but he is a reed that thinks. It needs
not that the whole universe should arm to crush him. He dies
from an exhalation, from a drop of water. But should the
universe conspire to crush him, man would still be nobler than
that by which he falls ; for he knows that he dies ; and of the
victory which the universe has over him, the universe knows
nothing. Thus our whole dignity consists in thought. * * *
Let us labor, then, to think aright; this is the foundation of
morality."

In the world of sense, illusive appearances hover around us

Supplies in part the
criterion of truth from
error.

like evil spirits ; unreal dreams mingle them-
selves with real knowledge ; the accustomed
assumes the character of certainty ; and the
associations of thought are mistaken for the connections of
existence. We thus require a criterion to discriminate truth
from error; and this criterion is, in part at least, supplied to
us by Logic. Logic teaches us to analyze the concrete masses
of our knowledge into its elements, and thus gives us a clear
and distinct apprehension of its parts ; it teaches us to think
consistently and with method ; and it teaches us how to build
up our accumulated knowledge into a firm and harmonious edi-
fice. The study of logic is as necessary for correct think-
ing, as the study of grammar is for correct speaking ; were it
not otherwise and in itself an interesting study to investigate the
mechanism of the human intellect in the marvelous processes

of thought. They, at least, who are familiar with this mechanism, are less exposed to the covert fallacies which so easily delude those unaccustomed to an analysis of these processes.

But it is not only by affording knowledge and skill that Logic is thus useful; it is perhaps equally conducive to the same end by bestowing power. The retorsion of thought upon itself—the thinking of thought—is a vigorous effort, and, consequently, an invigorating exercise of the Understanding; and as the understanding is the instrument of all scientific, of all philosophical, speculation, Logic, by preëminently cultivating the understanding, in this respect likewise vindicates its ancient title to be viewed as the best preparatory discipline for Philosophy and the sciences at large.

Invigorates the Understanding.

¶ V. But Logic is further useful as affording a Nomenclature of the laws by which legitimate thinking is governed, and of the violation of these laws, through which thought becomes vicious or null.

V. Utility of Logic—as affording a scientific nomenclature.

It is said, in Hudibras—

Illustration.

"That all a Rhetorician's rules
Serve only but to name his tools;"

and it may be safely confessed that this is one of the principal utilities of Rhetoric. A mere knowledge of the rules of Rhetoric can no more enable us to compose well, than a mere knowledge of the rules of Logic can enable us to think well. There is required from nature, in both, the faculty; but this faculty must, in both departments, be cultivated by an assiduous and also a well-directed exercise; that is, in the one, the powers of Comparison must be exercised according to the rules of a sound Rhetoric, in the other, according to the rules of a sound Logic. In so far, therefore, the utility of either science is something more than a mere naming of their tools. But the naming of their tools, though in itself of little value, is valuable as the condition of an

Importance of a scientific nomenclature.

important function, which, without this, could not be performed. Words do not give thoughts; but without words, thoughts could not be fixed, limited, and expressed. They are, therefore, in general, the essential condition of all thinking, worthy of the name. Now, what is true of human thought in general, is true of Logic and Rhetoric in particular. The nomenclature in these sciences is the nomenclature of certain general analyses and distinctions, which express to the initiated, in a single word, what the uninitiated could (supposing, what is not probable, that he could perform the relative processes) neither understand nor express without a tedious and vague periphrasis; while, in his hands, it would assume only the appearance of a particular observation, instead of a particular instance of a general and acknowledged rule. To take a very simple example: there is in Logic a certain sophism, or act of illegal inference, by which two things are, perhaps in a very

Example.

concealed and circuitous manner, made to prove each other. Now, the man unacquainted with Logic may perhaps detect and be convinced of the fallacy; but how will he expose it? He must enter upon a long statement and explanation, and after much labor to himself and others, he probably does not make his objection clear and demonstrative after all. But between those acquainted with Logic, the whole matter would be settled in two words. It would be enough to say and show that the inference in question involved a *circulus in concludendo*, and the refutation is at once understood and admitted. It is in like manner that one lawyer will express to another the *ratio decidendi* of a case in a single technical expression; while their clients will only perplex themselves and others in their attempts to set forth the merits of their cause. Now, if Logic did nothing more than establish a certain number of decided and decisive rules in reasoning and afford us brief and precise expressions by which to bring particular cases under these general rules, it would confer on all who in any way employ their intellect—that is, on the cultivators of every human science—the most import-

ant obligation. For it is only in the possession of such established rules, and of such a technical nomenclature, that we can accomplish, with facility, and to an adequate extent, a criticism of any work of reasoning. Logical language is thus, to the general reasoner, what the notation of Arithmetic, and still more of Algebra, is to the mathematician. Both enable us to comprehend and express, in a few significant symbols, what would otherwise overpower by their complexity ; and thus it is that nothing would contribute more to facilitate and extend the faculty of reasoning, than a general acquaintance with the rules and language of Logic—an advantage extending indeed to every department of knowledge, but more especially of importance to those professions which are occupied in inference, and conversant with abstract matter, such as Theology and Law.

III. DIVISIONS OF LOGIC.

I now proceed to the third of the preliminary questions—
III. Divisions of Logic. viz. : How is Logic divided? Now, it is manifest that this question may be viewed in two relations ; for, in asking how is Logic divided, we either mean how many kinds are there of Logic, or into how many constituent parts is it distributed? We may consider Logic either as a universal, or as an integrate, whole.

It is necessary to consider the former question first; for, before
I. The Species of Logic. proceeding to show what are the parts of which a logic is made up, it is requisite previously to determine what the logic is of which these parts are the components. Under the former head, I therefore give you the following:

¶ VI. Logic, considered as a Genus or Class, may, in different relations, be divided into different Species.
VI. Logic by relation to the mind, is Objective and Subjective. And, in the first place, considered by relation to the mind or thinking subject, Logic is divided into Objective and Subjective, or, in the language of some older authors, into *Logica systematica* and *Logica habitualis*.

By Objective or Systematic Logic is meant that complement

of doctrines of which the science of Logic is made up ; by Subjective or Habitual Logic is meant the speculative knowledge of these doctrines which any individual, as Socrates, Plato, Aristotle, may possess, and the practical dexterity with which he is able to apply them.

Now, it is evident that both these Logics, or rather Logic considered in this twofold relation, ought to be

proposed to himself by an academical instruc-. tor. We must, therefore, neglect neither. Logic considered as a system of rules, is only valuable as a mean toward logic considered as a habit of the mind ; and, therefore, a logical instructor ought not to think that he fulfills his duty—that he accomplishes all that he is called on to perform—if he limit himself to the mere enouncement of a code of doctrine, leaving his pupils to turn his instruction to their own account as best they may. On the contrary, he is bound to recollect that he should be something more than a book ; that he ought not only himself to deliver the one Logic, but to take care that his pupils acquire the other. The former, indeed, he must do as a condition of the latter ; but if he considers the systematic logic which he pronounces, as of any value, except in so far as his pupils convert it into an habitual logic, he understands nothing of the character of the function which he attempts to perform. It is, therefore, incumbent on an academical instructor, to do what in him lies to induce his pupils, by logical exercise, to digest what is presented to them as an objective system into a subjective habit. Logic, therefore, in both these relations belongs to us, and neither can be neglected without compromising the utility of a course like the present.

¶ VII. In the second place, by relation to its application or

non-application to objects, Logic is divided into Abstract or General, and into Concrete or Special.

Abstract Logic considers the laws of thought as poten-

Explication. tially applicable to the objects of all arts and sciences, but as not actually applied to those of any ; Concrete Logic considers these laws in their actual and immediate application to the object-matter of this or that particular science. The former of these is one, and alone belongs to philosophy, whereas the latter is as multiform as the arts and sciences to which it is relative.

This division of Logic does not remount to Aristotle, but it is found in his most ancient commentator, Alexander the Aphrodisian, and, after him, in most of the other Greek Logicians. Alexander illustrates the opposition of the logic divorced from things ($\chi\omega\rho\grave{\iota}\varsigma$ $\pi\rho\alpha\gamma\mu\acute{\alpha}\tau\omega\nu$—*rebus avulsa*), to the logic applied to things ($\grave{\epsilon}\nu$ $\chi\rho\acute{\eta}\sigma\epsilon\iota$ $\varkappa\alpha\grave{\iota}$ $\gamma\upsilon\mu\nu\alpha\sigma\acute{\iota}\alpha$ $\pi\rho\alpha\gamma\mu\acute{\alpha}\tau\omega\nu$—*rebus applicata*), by a simile. "The former," he says, "may be resembled to a geometrical figure, say a triangle, when considered abstractly and in itself; whereas the latter may be resembled to the same triangle, as concretely existing in this or that particular matter : for a triangle considered in itself is ever one and the same ; but viewed in relation to its matter, it varies according to the variety of that matter ; for it is different as it is of silver, gold, lead—as it is of wood, of stone, etc. The same holds good of Logic. General or Abstract Logic is always one and the same ; but as applied to this or to that object of consideration, it appears multiform." So far Alexander. This appearance of multiformity I may, however, add, is not real ; for the mind has truly only one mode of thinking, one mode of reasoning, one mode of conducting itself in the investigation of truth, whatever may be the object on which it exercises itself. Logic may, therefore, be again well compared to the authority of an universal empire—of an empire governing the world by common laws. In such a dominion there are many provinces, various regions, and different præfectures. There is one præfect in Asia, another in Europe, a third in Africa, and each is decorated by different

titles; but each governs and is governed by the common laws of the empire confided to his administration. The nature of General Logic may likewise be illustrated by another comparison. The Thames, for instance in passing London, is a single river—is one water—but is there applied to many and different uses. It is employed for drinking, for cooking, for brewing, for washing, for irrigation, for navigation, etc. In like manner, Logic in itself is one : as a science or an art, it is single ; but in its applications, it is of various and multiform use in the various branches of knowledge, conversant be it with necessary, or be it with contingent matter. Or further, to take the example of a cognate science, if any one were to lay down different grammars of a tongue, as that may be applied to the different purposes of life, he would be justly derided by all grammarians, indeed by all men ; for who is there so ignorant as not to know that there is but one grammar of the same language in all its various applications ?

Thus, likewise, there is only one method of reasoning, which all the sciences indifferently employ ; and although men are severally occupied in different pursuits, and although one is, therefore, entitled a Theologian, another a Jurist, a third a Physician, and so on, each employs the same processes, and is governed by the same laws, of thought. Logic itself is, therefore, widely different from the use—the application of Logic. For Logic is astricted to no determinate matter, but is extended to all that is the object of reason and intelligence. The use of Logic, on the contrary, although potentially applicable to every matter, is always actually manifested by special reference to some one. In point of fact, Logic, in its particular applications, no longer remains logic, but becomes part and parcel of the art or science in which it is applied. Thus Logic, applied to the objects of geometry, is nothing else than Geometry ; Logic, applied to the objects of physics, nothing else than Natural Philosophy. We have, indeed, certain treatises of Logic in reference to different sciences, which may

General Logic is alone one ; Special Logic is manifold and part of the science in which it is applied.

be viewed as something more than these sciences themselves. For example : we have treatises on Legal Logic, etc.; but such treatises are only introductions—only methodologies of the art or science to which they relate. For such special logics only exhibit the mode in which a determinate matter or object of science, the knowledge of which is presupposed, must be treated, the conditions which regulate the certainty of inferences in that matter, and the methods by which our knowledge of it may be constructed into a scientific whole. Special Logic is thus not a single discipline, not the science of the universal laws of thought, but a congeries of discipline, as numerous as there are special sciences in which it may be applied. Abstract or General Logic, on the contrary, in virtue of its universal character, can only and alone be one ; and can exclusively pretend to the dignity of an independent science. This, therefore, likewise exclusively concerns us.

¶ VIII. In the third place, considered by reference to the circumstances under which it can come into exercise by us, Logic —Logic General or Abstract—is divided into Pure and Modified ; a division, however, which is perhaps rather the distribution of a science into its parts than of a genus into its species. Pure Logic considers the laws of thought proper, as contained *a priori* in the nature of pure intelligence itself. Modified Logic, again, exhibits these laws as modified in their actual applications by certain general circumstances external and internal, contingent in themselves, but by which human thought is always more or less influenced in its manifestations.

VIII. General Logic Divided into Pure and Modified.

Pure Logic considers Thought Proper simply and in itself, and apart from the various circumstances by which it may be effected in its actual application. Human thought, it is evident, is not exerted except by men and individual men. By men, thought is not exerted out of connection with the other constituents of their intel-

Pure Logic.

lectual and moral character, and, in each individual, this character is variously modified by various contingent conditions of different original genius, and of different circumstances contributing to develop different faculties and habits. Now, there may be conceived a science, which considers thought not merely as determined by its necessary and universal laws, but as contingently affected by the empirical conditions under which thought is actually exerted; which shows what these conditions are, how they impede, and, in general, modify, the act of thinking; and how, in fine, their influence may be counteracted. This science is, Modified or Concrete Logic. What I have called Modified Logic is identical with what Kant and other philosophers have denominated Applied Logic.

Modified Logic.

Nomenclature of Modified Logic.

I may observe that it can be questioned whether Modified or Concrete Logic be entitled to the dignity of an essential part of Logic in general, far less of a coördinate species as opposed to Pure or Abstract Logic. You are aware, from what I have previously stated under the first introductory question, that Logic, as conversant about a certain class of mental phenomena, is only a part of the general philosophy of mind; but that, as exclusively conversant about what is necessary in the phenomena of thought, that is, the laws of thinking, it is contradistinguished from Empirical Psychology, or that philosophy of mind which is merely observant and inductive of the mental phenomena as facts. But if Modified or Concrete Logic be considered either as a part or as a species of General Logic, this discrimination of Logic, as the Nomology of thought, from Psychology, as the Phenomenology of mind, will not hold. For Modified Logic, presupposing a knowledge of the general and the contingent phenomena of mind, will thus either comprise Psychology within its sphere, or be itself comprised within the sphere of Psychology. But whichever alternative may be preferred, the two sciences are no longer distinct. It

Modified Logic not properly an essential part of Logic.

is on this ground that I hold, that, in reality, Modified Logic is neither an essential part nor an independent species of General Logic, but that it is a mere mixture of Logic and Psychology, and may, therefore, be called either Logical Psychology or Psychological Logic. There is thus in truth only one Logic, that is, Pure or Abstract Logic.

¶ IX. Pure Logic may, I think, best be distributed upon the following principles. We may think ; and we may think well. On the one hand, the conditions of thinking do not involve the conditions of thinking well ; but the conditions of thinking well involve the conditions of thinking. Logic, therefore, as the science of thought, must necessarily consider the conditions of the possibility of thought. On the other hand, the end of thought is not merely to think, but to think well ; therefore, as the end of a science must be conformed to the end of its object-matter, Logic, as the science of thought, must display not only the laws of possible, but the laws of perfect, thinking. Logic, therefore, naturally falls into two parts, the one of which investigates the formal conditions of mere thinking ; the other, the formal conditions of thinking well.

1. In regard to the former : The conditions of mere thinking are given in certain. elementary requisites ; and that part of Logic which analyzes and considers these, may be called its Stoicheiology, or Doctrine of Elements. These elements are either Laws or Products.

2. In regard to the latter, as perfect thinking is an end, and as, the elementary means being supposed, the conditions of an end are the ways or methods by which it may be accomplished, that part of Logic which analyzes and considers the methods of perfect thinking, may be called its Methodology, or Doctrine of Method.

Thus PURE LOGIC is divided into two parts—into Stoicheiology, or the Doctrine of Elements, and Methodology, or the Doctrine of Method. Of these in their order.

Logical Stoicheiology, or the doctrine conversant about the elementary requisites of mere thought, I shall divide into two parts. The first of these treats of the Fundamental Laws of thinking; in other words, of the universal conditions of the thinkable—Noetic-Nomology. The second treats of the laws of thinking, as governing the special functions, faculties, or products of thought, in its three gradations of Conception, or, as it is otherwise called, Simple Apprehension; Judgment; and Reasoning—Dianoetic-Dynamic.

This second part of Stoicheiology will, therefore, fall into three subordinate divisions corresponding to these several degrees of Conception, Judgment, and Reasoning. So much for the Doctrine of Elements.

Logical Methodology, or the doctrine conversant about the regulated ways or methods in which the means of thinking are conducted to their end of thinking well, is divided into as many parts as there are methods, and there are as many methods as there are different qualities in the end to be differently accomplished. Now the perfection of thought consists of three virtues—Clear Thinking, Distinct Thinking, and Connected Thinking; each of these virtues is accomplished by a distinct method; and the three methods will consequently afford the division of Logical Methodology into three parts.

The first part comprises the method of Clear Thinking, or the doctrine of Illustration or Definition.

The second part comprises the Method of Distinct Thinking, or the doctrine of Division.

The third part comprises the Method of Concatenated or Connected Thinking, or the Doctrine of Proof.

These parts are only, however, three particular applications of Method; they, therefore, constitute each only a Special Methodology. But such methodology, or union of methodologies, supposes a previous consideration of method in general, in its notion, its species, and its conditions. Logical Methodology will therefore consist of two parts, of a General and of a Special—the Special being subdivided, as above stated.

The fourth and fifth questions of the Introduction would

IV. The History of now fall to be considered—viz., What is the
Logic. History, and what is the Bibliography, of
Logic? The history of a science is a narrative of the order
in which its several parts have been developed, and of the
contributions which have been made to it by different culti-
vators; but such a narrative necessarily supposes a previous
knowledge of the contents of the science—a knowledge which
is identical with a knowledge of the science itself. It is,
therefore, evident that a history of Logic can only be pro-
posed with advantage to those who are already in some degree
familiar with Logic itself.

In regard to the fifth question—What is the Bibliography

V. The Bibliography or Literature of Logic?—the same is true,
of Logic. in so far as a knowledge of the books writ-
ten upon a science is correlative to a knowledge of its history.
At the same time, nothing could be more unprofitable than for
me to recite to you a long series of works to which you have
not access, by authors of whom you probably never heard,
often in languages which few of you understand.

PURE LOGIC.

PART I.

STOICHEIOLOGY.

SECTION I.—ON THE FUNDAMENTAL LAWS OF THOUGHT.

HAVING terminated our consideration of the various ques-
tions of which the Introduction to Logic is
composed, we proceed to the doctrines which
make up the science itself, and commence the First Great Divi-
sion of PURE LOGIC—that which treats of its elementary or
constituent processes—Stoicheiology. But Stoicheiology was
again divided into two parts—into a part which considered the
Fundamental Laws of Thought in general, and into a part
which considered these laws as applied to and regulating the
special function of Thought in its various gradations of Con-
ception, Judgment, and Reasoning.

Stoicheiology.

Before, however, descending to the consideration of these
laws, it is necessary to make one or two pre-
liminary statements touching the character
of that thought of which they are the necessary conditions;
and, on this point, I give, in the first place, the following para-
graph:

The character of Thought in general.

¶ X. Logic considers Thought, not as the operation of
thinking, but as its product; it does not treat of Conception,
Judgment, and Reasoning, but of Concepts, Judgments, and
Reasonings.

(34)

I have already endeavored to give you a general knowledge
Thought as the ob- of what is meant by *thought*. You are aware
ject of Logic. that this term is, in relation to Logic, em-
ployed in its strictest and most limited signification—viz., as
the act or product of the Discursive Faculty, or Faculty of
Relations ; but it is now proper to consider, somewhat more
closely, the determinate nature of this process, and the special
point of view in which it is regarded by the logician.

In an act of thinking, there are three things which we can
The subject, form, discriminate in consciousness—1°. There is
and matter of thought. the thinking subject, that is, the mind or
ego, which exerts or manifests the thought ; 2°. There is the
object about which we think, which is called the *matter* of
thought ; and, 3°. There is a relation between subject and
object of which we are conscious—a relation always manifested in
some determinate mode or manner ; this is the *form* of thought.
Thought as the object Now, of these three, Logic does not consider
respectively of Psychol- either the first or the second. It takes no
ogy and of Logic. account, at least no direct account, of the real
subject, or of the real object, of thought, but is limited exclu-
sively to the form of thought. This has been already stated.
But, again, this form of thought is considered by Logic only
in a certain aspect. The form of thought may be viewed on
two sides or in two relations. It holds, as has been said, a
relation both to its subject and to its object, and it may accord-
ingly be viewed either in the one of these relations or in the
other. In so far as the form of thought is considered in refer-
ence to the thinking mind—to the mind by which it is exerted—
it is considered as an act, or operation, or energy ; and in this
relation it belongs to Phenomenal Psychology. Whereas, in
so far as this form is considered in reference to what thought
is about, it is considered as the product of such an act, and, in
this relation, it belongs to Logic. Thus Phenomenal Psychol-
ogy treats of thought proper as conception, judgment, reason-
ing ; Logic, or the Nomology of the understanding, treats of
thought proper as a concept, as a judgment, as a reasoning.

Whately, among other errors in his determination of the object-matter of Logic, confounds or reverses this; for he proposes to Logic, not thought considered as a product, but reasoning alone; and that, too, considered as a producing operation. He thus confounds Logic with Phenomenal Psychology.

Be it, therefore, observed, that Logic, in treating of the formal laws of thought, treats of these in reference to thought considered as a product; that is, as a concept, a judgment, a reasoning; whereas Psychology, as the Phenomenology of mind, considers thought as the producing act, that is, as conception, judgment, reasoning.

XI. Thought a mediate and complex cognition.

¶ XI. Thought, as the knowledge of one thing in relation to another, is a mediate and complex cognition.

The distinctive peculiarity of thinking in general is, that it involves the cognition of one thing by the cognition of another.

Explication.

All thinking is, therefore, a mediate cognition; and is thus distinguished from our knowledge in perception, external and internal, and in imagination; in both of which acts we are immediately cognitive of the object, external or internal, presented in the one, and of the object, external or internal, represented in the other. In the Presentative and Representative Faculties, our knowledge is of something considered directly and in itself; in thought, on the contrary, we know one object only through the knowledge of another. Thus in perception, of either kind, and in imagination, the object known is always a single determinate object; whereas in thought—in thought proper—as one object is only known through another, there must always be a plurality of objects in every single thought. Let us take an example of this, in regard to the simplest act of thought. When I see an individual—say Bucephalus or Highflyer—or when I represent him in imagination, I have a direct and immediate apprehension of a certain object in and through itself,

without reference to aught else. But when I pronounce the term *Horse*, I am unable either to perceive in nature, or to represent in imagination, any one determinate object corresponding to the word. I obtain the notion corresponding to this word, only as the result of a comparison of many perceptions or imaginations of Bucephalus, Highflyer, Dobbin, and other individual horses; it, therefore, contains many representations under it, has reference to many objects, out of relation to which it can not possibly be realized in thought; and it is in consequence of this necessity of representing (potentially at least) a plurality of individual objects under the notion *horse*, that it obtains the denomination *concept*, that is, something taken up or apprehended in connection with something else.

This, however, requires a further explication. When we perform an act of thought, of positive thought, this is done by thinking something, and we can think anything only by thinking it as existing; while, again, we can not think a thing to exist except in certain determinate modes of existence. On the other hand, when we perform an act of negative thought, this is done by thinking something as not existing in this or that determinate mode, and when we think it as existing in no determinate mode, we cease to think it at all; it becomes a nothing, a logical nonentity (*non-ens Logicum*).

It being thus understood that thought can only be realized by thinking something; it being further understood that this something, as it is thought, must be thought as existing; and it being still further understood that we can think a thing as existing only by thinking it as existing in this, that, and the other determinate manner of existence, and that whenever we cease to think something, something existing, something existing in a determinate manner of existence, we cease to think at all; this, I say, being understood, it is here proper to make you, once for all, acquainted with the various terms by which logicians designate the modes or manners of cogitable existence. I shall therefore comprise these in the following paragraph:

¶ XII. When we think a thing, this is done by conceiving it as

XII. The various
terms by which the
modes of cogitable ex-
istence are designated.

possessed of certain modes of being, or quali-
ties, and the sum of these qualities constitutes
its *concept* or *notion* (νόημα, ἔννοια, ἐπίνοια,
conceptum, conceptus, notio).   As these quali-
ties or modes (ποιότητες, *qualitates, modi*) are only identified
with the thing by a mental attribution, they are called *attributes*
(κατηγορούμενα, *attributa*) ; as it is only in or through them
that we say or enounce aught of a thing, they are called *pre-
dicates, predicables,* and *predicaments,* or *categories,* these
words being here used in their more extensive signification
(λεγόμενα χερί, κατηγορίαι, κατηγορήματα, κατηγορούμενα,
prædicata, prædicabilia, prædicamenta) ; as it is only in and
through them that we recognize a thing for what it is, they are
called *notes, signs, marks, characters* (*notæ, signa, characteres,
discrimina*) ; finally, as it is only in and through them that we
become aware that a thing is possessed of a peculiar and
determinate existence, they are called *properties, differences,
determinations* (*proprietates, determinationes*).   As consequent
on, or resulting from, the existence of a thing, they have like-
wise obtained the name of *consequents* (ἐπόμενα, *consequentia,*
etc.).   What in reality has no qualities, has no existence in
thought—it is a logical nonentity ; hence, *e converso,* the
scholastic aphorism—*non-entis nulla sunt prædicata.*   What,
again, has no qualities attributed to it, though attributable, is
said to be *indetermined* (ἀδιόριστον, *indeterminatum*) ; it is
only a possible object of thought.

This paragraph, which I have dictated that you might be

made once for all acquainted with the rela-
tive terms in use among logicians, requires but
little explanation.   I may state, however,
that the mind only thinks an object by separating it from
others ; that is, by marking it out or characterizing it ; and in
so far as it does this, it incloses it within certain fixed limits,
that is, determines it.   But if this discriminative act be
expressed in words, I predicate the marks, notes, characters, or
determinations of the thing ; and if, again, these be compre-

hended in one total thought, they constitute its concept or notion. If, for example, I think of Socrates as son of *Sophroniscus*, as *Athenian*, as *philosopher*, as *pug-nosed*, these are only so many characters, limitations, or determinations, which I predicate of Socrates, which distinguish him from all other men, and together make up my notion or concept of him.

But as thought, in all its gradations of conception, judgment,

The attribution in- volved in thought is regulated by laws. and reasoning, is only realized by the attribution of certain qualities or characters to the objects of, or about which we think; so this attribution is regulated by laws, which render a great part of this process absolutely necessary. But when I speak of

What is meant by a law as applicable to free intelligence. laws and of their absolute necessity in relation to thought, you must not suppose that these laws and that necessity are the same in the world of mind as in the world of matter. For free intelligences, a law is an ideal necessity given in the form of a precept, which we ought to follow, but which we may also violate if we please; whereas, for the existences which constitute the universe of nature, a law is only another name for those causes which operate blindly and universally in producing certain inevitable results. By *law of thought,* or by *logical necessity,* we do not, therefore, mean a physical law, such as the law of gravitation, but a general precept which we are able certainly to violate, but which if we do not obey, our whole process of thinking is suicidal, or absolutely null. These laws are, consequently, the primary conditions of the possibility of valid thought, and as the whole of Pure Logic is only an articulate development of the various modes in which they are applied, their consideration in general constitutes the first chapter in an orderly system of the science.

¶ XIII. The Fundamental Laws of Thought, or the con-

XIII. Fundamental Laws of Thought. ditions of the thinkable, as commonly received, are four: 1. The Law of Identity; 2. The Law of Contradiction; 3. The Law of Exclusion or

of Excluded Middle ; and, 4. The Law of Reason and Conse-
quent, or of Sufficient Reason.

Of these in their order.

¶ XIV. The principle of Identity (*principium Identitatis*)
expresses the relation of total sameness in
which a concept stands to all, and the rela-
tion of partial sameness in which it stands to each, of its
constituent characters. In other words, it declares the impos-
sibility of thinking the concept and its characters as recipro-
cally unlike. It is expressed in the formula *A is A*, or *A=A ;*
and by *A* is denoted every logical thing, every product of our
thinking faculty—concept, judgment, reasoning, etc.

XIV. Law of Identity.

The principle of Identity is an application of the principle
of the absolute equivalence of a whole and
of all its parts taken together, to the think-
ing of a thing by the attribution of constituent qualities or
characters. The concept of the thing is a whole, the charac-
ters are the parts of that whole. This law may, therefore, be
also thus enounced : Everything is equal to itself—for in a
logical relation the thing and its concept coincide ; as, in Logic,
we abstract altogether from the reality of the thing which the
concept represents. It is, therefore, the same whether we say
that the concept is equal to all its characters, or that the thing
is equal to itself.

Explication.

The law has, likewise, been expressed by the formula—In
the predicate, the whole is contained explicitly, which in the
subject is contained implicitly. It is also involved in the
axiom—*Nota notæ est nota rei ipsius.*

The logical importance of the law of identity lies in this :
that it is the principle of all logical affirma-
tion and definition. An example or two may
be given to illustrate this.

*Its logical import-
ance—The principle of
all logical affirmation
and definition.*

    1. In a concept, which we may call Z, the
characters *a*, *b*, and *c*, are thought as its constituents ; conse-

quently, the concept, as a unity, is equal to the characters taken

This illustrated. together—$Z=(a+b+c)$. If the former be affirmed, so also is the latter; therefore, Z being $(a+b+c)$ is a, is b, is c. To take a concrete example : The concept *man* is a complement made up of the characters, 1°. *substance*, 2°. *material*, 3°. *organized*, 4°. *animated*, 5°. *rational*, 6°. *of this earth:* in other words *man* is *substance*, is *material*, is *organized*, is *animated*, is *rational*. *Being*, as entering into every attribution, may be discharged as affording no distinction.

2. Again, suppose that, in the example given, the character a is made up of the characters l, m, n, it follows, by the same law of Identity, that $Z=a=(l, m, n)$ is l, is m, is n. The concept *man* contains in it the character *animal*, and the character *animal* contains in it the characters *corporeal, organized, living*, etc.

The second law-is the principle of Contradiction or Non-contradiction, in relation to which I shall dictate the following paragraph :

¶ XV. When an object is determined by the affirmation of

XV. Law of contradiction a certain character, this object can not be thought to be the same when such character is denied of it. The impossibility of this is enounced in what is called the principle of Contradiction (*principium Contradictionis seu Repugnantiæ*). Assertions concerning a thing are mutually contradictory, when the one asserts that the thing possesses the character which the other asserts that it does not. This law is logically expressed in the formula : What is contradictory is unthinkable. $A=not\ A=0$, *or* $A-A=0$.

Now, in the first place, in regard to the name of this law,

Its proper name. it may be observed that, as it enjoins the absence of contradiction as the indispensable condition of thought, it ought to be called, not the Law of Contradiction, but the Law of Non-contradiction, or of *non-repugnantia*.

4

This law has frequently been enounced in the formula : It is
impossible that the same thing can at once
be and not be ; but this is exposed to sundry
objections.   It is vague, and therefore useless.   It does not
indicate whether a real or a notional existence is meant ; and
if it mean the former, then is it not a logical but a metaphysi-
cal axiom.   But even as a metaphysical axiom it is imperfect ;
for to the expression *at once (simul)* must be added, *in the same
place, in the same respect,* etc.

<div style="margin-left:2em">How enounced.</div>

This law has likewise been expressed by the formula : Con-
tradictory attributes can not be united in one act of conscious-
ness.   But this is also obnoxious to objection.   For a judgment
expresses as good a unity of consciousness as a concept.   But
when I judge that *round* and *square* are contradictory attri-
butes, there are found in this judgment contradictory attri-
butes, but yet a unity of consciousness.   The formula is,
therefore, vaguely and inaccurately expressed.

The logical import of this law lies in its being the principle
of all logical negation and distinction.
The law of Identity and the law of Con-
tradiction are coördinate and reciprocally
relative, and neither can be educed as second from the other as
first ; for in every such attempt at derivation, the supposed
secondary law is, in fact, always necessarily presupposed.
These are, in fact, one and the same law, differing only by a
positive and negative expression.

<div style="margin-left:2em">The principle of all
logical negation and
distinction.</div>

In relation to the third law, take the following paragraph :

¶ XVI. The principle of Excluded Third or Middle, viz. :
between two contradictories (*principium
Exclusi Medii vel Tertii*), enounces that con-
dition of thought which compels us, of two
repugnant notions, which can not both coëxist, to think either
the one or the other as existing.   Hence arises the general
axiom : Of contradictory attributions, we can only affirm one
of a thing ; and if one be explicitly affirmed, the other is

<div style="margin-left:2em">XVI. Law of Exclud-
ed Middle.</div>

implicitly denied. *A either is or is not. A either is or is not B.*

By the laws of Identity and Contradiction, I am warranted to conclude from the truth of one contradictory proposition to the falsehood of the other, and by the law *Logical significance of this law.* of Excluded Middle, I am warranted to conclude from the falsehood of one contradictory proposition to the truth of the other. And in this lies the peculiar force and import of this last principle. For the logical significance of the law of Excluded Middle consists in this, that it limits or shuts in the sphere of the thinkable in relation to affirmation ; for it determines, that, of the two forms given in the laws of Identity and Contradiction, and by these laws affirmed as those exclusively possible, the one or the other must be affirmed as necessary.

The law of Excluded Middle is the principle of Disjunctive *The principle of Disjunctive Judgments.* Judgments, that is, of judgments in which a plurality of judgments are contained, and which stand in such a reciprocal relation that the affirmation of the one is the denial of the other.

I now go on to the fourth law.

¶ XVII. The thinking of an object, as actually character- *XVII. Law of Sufficient Reason, or of Reason and Consequent.* ized by positive or by negative attributes, is not left to the caprice of Understanding— the faculty of thought ; but that faculty must be necessitated to this or that determinate act of thinking by a knowledge of something different from, and independent of, the process of thinking itself. This condition of our understanding is expressed by the law, as it is called, of Sufficient Reason (*principium Rationis Sufficientis*) ; but it is more properly denominated the law of Reason and Consequent (*principium Rationis et Consecutionis*). That knowledge by which the mind is necessitated to affirm or posit something else, is called the *logical reason, ground,* or *antecedent;* that

something else which the mind is necessitated to affirm or posit, is called the *logical consequent;* and the relation between the reason and consequent, is called the *logical connection* or *consequence.* This law is expressed in the formula: Infer nothing without a ground or reason.

Relations between Reason and Consequent.

The relations between Reason and Consequent, when comprehended in a pure thought, are the following:

1. When a reason is explicitly or implicitly given, then there must exist a consequent; and, *vice versa,* when a consequent is given, there must also exist a reason.

2. Where there is no reason there can be no consequent; and, *vice versa,* where there is no consequent, either implicitly or explicitly, there can be no reason. That is, the concepts of reason and of consequent, as reciprocally relative, involve and suppose each other.

The logical significance of the law of Reason and Consequent lies in this: That in virtue of it, thought is constituted into a series of acts all indissolubly connected; each necessarily inferring the other. Thus it is that the distinction and opposition of possible, actual, and necessary matter, which has been introduced into Logic, is a doctrine wholly extraneous to this science.

Logical significance of this law.

I may observe that Reason is something different from Cause, and Consequent something different from Effect; though cause and effect, in so far as they are conceived in thought, stand to each other in the relation of reason and consequent. Cause is thus thought of as a real object, which affords the reason of the existence of another real object, the effect; and effect is thought of as a real object, which is the consequent of another real object, the cause. Accordingly, every cause is recognized in thought as a reason, and every effect is recognized in thought as a consequent; but the converse is not true,

Reason and Consequent, and Cause and Effect.

that every reason is really considered a cause, and every con-
sequent really considered an effect. We must, therefore, care-
fully distinguish mere reason and mere consequent, that is,
ideal or logical reason and consequent, from the reason which
is a cause and the consequent which is an effect, that is, real
or metaphysical reason and consequent.

The expression *logical reason and consequent* refers to the
mere synthesis of thoughts; whereas the
expression *metaphysical reason and conse-*
quent denotes the real connection of exist-
ences. Hence the axiom of Causality, as a
metaphysical principle, is essentially different from the axiom
of Reason and Consequent, as a logical principle. Both, how-
ever, are frequently confounded with each other; and the law
of Reason and Consequent, indeed, formerly found its place in
the systems of metaphysic, while it was not, at least explicitly,
considered in those of Logic. The two
terms *condition* and *conditioned* happily
express at once the relations both of reason
and consequent, and of cause and effect. A
condition is a thing which determines (negatively at least) the
existence of another; the conditioned is a thing whose exist-
ence is determined in and by another. If used in an ideal or
logical signification, *condition* and *conditioned* import only the
reason in conjunction with its consequent; if used in a real or
metaphysical sense, they express the cause in connection with
its effect.

We have thus considered the conditions of Logic, in so far
as certain laws or principles are prescribed;
we have now to consider its conditions, in so
far as certain postulates are demanded. Of these there are
more than one; but one alone it is here requisite to signalize;
for although it be necessarily supposed in the science, strange
to say, it has, by logical writers, not only been always passed
over in silence, but frequently and inconsistently violated.
This postulate I comprise in the following paragraph:

Marginal notes:

Logical and Meta-
physical Reason and
Consequent.

Generality of the
terms Condition and
Conditioned.

Postulates of Logic.

¶ XVIII. The only postulate of Logic which requires an articulate enouncement is the demand, that before dealing with a judgment or reasoning expressed in language, the import of its terms should be fully understood; in other words, Logic postulates to be allowed to state explicitly in language all that is implicitly contained in the thought.

This postulate can not be refused. In point of fact, as I have said, Logic has always proceeded on it, in overtly expressing all the steps of the mental process in reasoning—all the propositions of a syllogism; whereas, in common parlance, one at least of these steps or propositions is usually left unexpressed. This postulate, as we shall have occasion to observe in the sequel, though a fundamental condition of Logic, has not been consistently acted on by logicians in their development of the science; and from this omission have arisen much confusion and deficiency and error in our present system of Logic. The illustration of this postulate will appropriately find its place on occasion of its applications. I now articulately state it, because it immediately follows in order the general axioms of the science; and, at present, I only beg that you will bear it in mind.

I may, however, before leaving the subject, observe (what has already, I believe, been mentioned), that Aristotle states of syllogistic—and, of course, his statement applies to Logic in general—that the doctrine of syllogism deals, not with the external expression of reasoning, in ordinary language, but with the internal reasoning of the mind itself. But of this again, and more fully, in the proper places.

SECTION II.—OF THE PRODUCTS OF THOUGHT.

I.—OF CONCEPTS OR NOTIONS.

A. OF CONCEPTS IN GENERAL.

HAVING considered, therefore, the four Laws of Thought, with the one Postulate of Logic, which constituted the First Section of the Doctrine of Logical Elements, I now proceed to the Second—that which is conversant about Logical Products. These products, though identical in kind, are of three different degrees; for while Concepts, Judgments, and Reasonings, are all equally the products of the same Faculty of Comparison, they still fall into three classes, as the act, and, consequently, the result of the act, is of a greater or a less simplicity. These three degrees are all in fact, strictly, only modifications of the second, as both concepts and reasonings may be reduced to judgments; for the act of judging, that is, the act of affirming or denying one thing of another in thought, is that in which the Understanding or Faculty of Comparison is essentially expressed. By anticipation, a concept is a judgment; for, on the one hand, it is nothing but the result of a foregone judgment, or series of judgments, fixed and recorded in a word—a sign; and it is only amplified by the annexation of a new attribute, through a continuance of the same process. On the other hand, as a concept is thus the synthesis or complexion, and the record, I may add, of one or more prior acts of judgment, it can, it is evident, be analyzed into these again; every concept is, in fact, a judgment or a fasciculus of judgments, these judgments only not explicitly developed in thought, and not formally expressed in terms.

The Products of Thought. — Concepts, Judgments, and Reasonings.

These are all products of Comparison, and all modifications of judgment.

Again, a reasoning is a judgment; for a reason is only the affirmation of the connection of two things with a third, and, through that third, with each other. It is thus only the same function of thought, which is at work in Conception, Judgment, and Reasoning; and these express no real, no essential, distinction of operation, but denote only the different relations in which we may regard the indivisible act of thought. Thus, the consideration of concepts can not be effected out of all relation to, and without even some anticipation of, the doctrine of judgments. This being premised, I now proceed to the consideration of the Products of Thought, viewed in the three relations of the three degrees, of Concepts, Judgments, and Reasonings.*

A. Of Concepts or Notions in General :

What are they?

In answering this question, let us, first, consider the meaning of the expressions; and, secondly, the nature of the thing expressed.

¶ XIX. *Concept* or *notion* (ἔννοια, ἐννόημα, νόημα, ἐπίνοια, *conceptio*, *notio*), are terms employed as con-

vertible, but, while they denote the same thing, they denote it in a different point of view. *Conception*, the act of which *concept* is the result, expresses the act of comprehending or grasping up into unity the various qualities by which an object is characterized; *notion* (*notio*), again, signifies either the act of apprehending, signalizing, that is, the remarking or taking note of, the various notes, marks, or characters of an object, which its qualities afford; or the result of that act.

The term *notion*, like *conception*, expresses both an act and

its product. I shall, however, as has commonly been done, use it only in this latter relation. This word has, like *conception*,

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* See Appendix A.

been sometimes abusively applied to denote not only our knowledge of things by their common characters, but, likewise, to include the mere presentations of Sense and representations of Phantasy. This abusive employment has, however, not been so frequent in reference to this term as to the term *conception;* but it must be acknowledged, that nothing can be imagined more vague and vacillating than the meaning attached to *notion* in the writings of all British philosophers, without exception. So much for the expressions *concept* and *notion.* I now go on to that which they express.

¶ XX. In our Consciousness—apprehension—of an individual object, there may be distinguished the two following cognitions: 1°. The immediate and irrespective knowledge we have of the individual object, as a complement of certain qualities or characters, considered simply as belonging to itself. 2°. The mediate and relative knowledge we have of this object, as comprising qualities or characters common to it with other objects.

<div style="margin-left:2em">XX. Concepts—(b) Nature of the thing.</div>

The former of these cognitions is that contained in the Presentations of Sense, external and internal, and Representations of Imagination. They are only of the individual or singular. The latter is that contained in the Concepts of the Understanding, and is a knowledge of the common, general, or universal.

The conceiving an object is, therefore, its recognition mediately through a concept ; and a Concept is *the cognition or idea of the general character or characters, point or points, in which a plurality of objects coincide.*

This requires some illustration, and it will be best afforded by considering the history of our knowledge. Our mental activity is not first exerted in an apprehension of the general, common properties of things. On the contrary, objects

<div style="margin-left:2em">Concepts—their nature illustrated by reference to the history of our knowledge.</div>

are originally presented to us in confused and imperfect per-
ceptions. The rude materials furnished by
Sense, retained in Memory, reproduced by
Reminiscence, and represented in Imagina-
tion, the Understanding elaborates into a
higher knowledge, simply by means of Comparison and Abstrac-
tion. The primary act of Comparison is exerted upon the
individual objects of Perception and Imagination alone. In the
multitude and complexity of these objects, certain attributes are
found to produce similar, others to produce
dissimilar, impressions. The observation of
this fact determines a reflective consideration
of their properties. Objects are intention-
ally compared together for the purpose of discovering their
similarities and differences. When things are found to agree
or to disagree in certain respects, the consciousness is, by an
act of volition, concentrated upon the objects which thus par-
tially agree, and, in them, upon those qualities in or through
which they agree; and by this concentration—which consti-
tutes the act called *Attention*—what is effected? On the
objects and qualities, thus attentively considered, a strong light
is shed; but precisely in proportion as these are illuminated in
consciousness, the others, to which we do not attend, are thrown
into obscurity.

The result of Attention, by concentrating the mind upon
certain qualities, is thus to withdraw or
abstract it from all else. In technical lan-
guage, we are said *to prescind* the phenomena
which we exclusively consider. *To prescind*,
to attend, and *to abstract*, are merely different but correlative
names for the same process; and the first two are nearly con-
vertible. When we are said *to prescind* a quality, we are
merely supposed to attend to that quality exclusively. Atten-
tion and Abstraction are only the same process viewed in dif-
ferent relations. They are, as it were, the positive and
negative poles of the same act.

[margin notes:]
Objects are originally presented in confused and imperfect percep-
tions.

Offices of Compari-
son and Abstraction or
Attention.

Precision, Attention,
and Abstraction are
correlative names for
the same process.

By Comparison, the points of resemblance among things being thus discovered, and by Attention constituted into exclusive objects; by the same act they are also reduced in consciousness from multitude to unity. What is meant by this will be apparent from the following considerations.

We are conscious to ourselves that we can repeat our acts of consciousness—that we can think the same thought over and over. This act, or this thought, is always in reality the same, though manifested at different times; for no one can imagine that in the repetition of one and the same thought he has a plurality of thoughts; for he is conscious that it is one and the same thought which is repeated, so long as its contents remain identical.

<div style="margin-left:2em; font-size:smaller">The reduction of objects from multitude to unity — explained and illustrated.

Thought is one and the same, while its contents are identical.</div>

Now, this relation of absolute similarity which subsists between the repetitions of the same thought, is found to hold between our representations of the resembling qualities of objects. Two objects have similar qualities only as these qualities afford a similar presentation in sense or a similar representation in imagination, and qualities are to us completely similar, when we are unable to distinguish their cognitions. But what we can not distinguish, is, to us, the same; therefore, objects which determine undistinguishable impressions upon us, are perceived and represented in the same mental modification, and are subjectively to us precisely as if they were objectively identical.

<div style="margin-left:2em; font-size:smaller">Objects are to us the same when we are unable to distinguish their cognitions.</div>

But the consciousness of identity is not merely the result of the indiscernible similarity of total objects; it is equally the result of the similarity of any of their parts—partial characters. For by abstracting observation from the qualities, points, in which objects differ, and limiting it to those in which they agree, we are able to consider them as identical in certain respects, however diverse they may appear to be in others, which, for the moment, we throw out of view. For example: let B, C, and D represent a series of individual

<div style="margin-left:2em; font-size:smaller">The consciousness of identity is equally the result of the similarity of any of the partial characters of objects.</div>

objects, which all agree in possessing the resembling attributes
of y y y, and severally differ in each respectively possessing
the non-resembling attributes i, o, u. Now, in so far as we
exclusively attend to the resembling qualities, we, in the first
place, obscure or remove out of view their non-resembling
characters i, o, u, while we remain exclusively conscious of
their resembling qualities y y y. But, in the second place, the
qualities expressed by y y y determine in us cognitive energies
which we are unable to distinguish, and which we, therefore,
consider as the same. We therefore view the three similar
qualities in the three different objects as also identical; we
consider the y in this, the y in that, and the y in the third
object, as one; and in so far as the three objects participate in
this oneness or identity, we regard them as also the same. In
other words, we classify B, C, and D, under y; y is the genus;
B, C, and D are its individuals or species, severally distinguished
from each other by the non-resembling properties, i, o, u. Now,
it is the points of similarity thus discovered and identified in the
unity of consciousness, which constitute Concepts or Notions.*

It is evident that the same process of Comparison and
Abstraction may be again performed on the concepts thus
formed. They are, in like manner, compared

Generalization.

together, and their points of resemblance
noted, exclusively considered, and reduced to one in the syn-
thesis of thought. This process is called *Generalization;* that
is, the process of evolving the general or one, out of the indi-
vidual and manifold. Notions and concepts

Concepts or notions
superfluously styled
general.

are also sometimes designated by the style
of *general notions—general conceptions.* This
is superfluous; for, in propriety of speech, notions and concepts
are, in their very nature, general; while the other cognitive mod-
ifications to which they are opposed—perceptions and imagina-
tions—have, in like manner, their essence in their individuality.

By the way, you may have noticed that I never use the term

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* See Appendix B.

idea.   The reason of my non-employment of that word
is this : There is no possible diversity of

Idea — reason why
not regularly employ-
ed, and sense in which
it is occasionally used,
by the Author.

meaning in which that term has not been
usurped ; and it would only confuse you, were
I to attempt to enumerate and explain them.
I may, however, occasionally not eschew the
word ; but if you ever hear it from me, I beg you to observe,
that I apply it, in a loose and general signification, to compre-
hend the presentations of Sense, the representations of Phan-
tasy, and the concepts or notions of the Understanding.   We
are in want of a generic term to express these ; and the word
representation (representatio), which, since the time of Leibnitz,
has been commonly used by the philosophers of the Continent,
I have restricted to denote, what it only can in propriety
express, the immediate object or product of Imagination.   We
are, likewise, in want of a general term to express what is com-
mon to the presentations of Perception, and the representations
of Phantasy, that is, their individuality and immediacy.   The
Germans express this by the term *Anschauung,* which can only
be translated by *intuition* (as it is in Latin by Germans), which
literally means *a looking at.*   This expression has, however,
been preoccupied in English to denote the apprehension we
have of self-evident truths, and its application in a different
signification, would therefore be, to a certain extent, liable to
ambiguity.   I shall, therefore continue, for the present at least,
to struggle on without such a common term, though the neces-
sity thus imposed of always opposing presentation and repre-
sentation to concept, is both tedious and perplexing.

¶ XXI.   A concept or notion thus involves—1°. The rep-
resentation of a part only of the various attri-

XXI. General Char-
acters of Concepts.
(a) A Concept affords
only inadequate knowl-
edge.

butes or characters of which an individual
object is the sum ; and, consequently, affords
only a one-sided and inadequate knowledge
of the things which are thought under it.

This is too simple to require any commentary.   It is evident

that when we think Socrates by any of the concepts—*Athenian,*

Greek, European, man, biped, animal, being

Explication.

—we throw out of view the far greater number of characters of which Socrates is the complement, and those, likewise, which more proximately determine or constitute his individuality. It is, likewise, evident, that in proportion as we think him by a more general concept, we shall represent him by a smaller bundle of attributes, and, consequently, represent him in a more partial and one-sided manner. Thus, if we think him as *Athenian,* we shall think him by a greater number of qualities than if we think him by *Greek;* and, in like manner, our representation will be less and less adequate, as we think him by every higher concept in the series—*European, man, biped, animal, being.*

¶ XXII. 2°. A concept or notion, as the result of comparison, necessarily expresses a relation. It

XXII. (b) A Concept affords no absolute object of knowledge.

is, therefore, not cognizable in itself; that is, it affords no absolute or irrespective object of knowledge, but can only be realized in consciousness by applying it, as a term of relation, to one or more of the objects, which agree in the point or points of resemblance which it expresses.

In this paragraph (if I may allude to what you may not all be aware of) is contained a key to the whole mystery of Generalization and General Terms; for the whole disputes between the Conceptualists and Nominalists (to say nothing of the Realists) have only arisen from concepts having been regarded as affording an irrespective and independent object of thought.

This paragraph contains a key to the mystery of Generalization and General Terms.

This illusion has arisen from a very simple circumstance. Objects compared together are found to possess certain attributes, which, as producing indiscernible modifications in us, are to us absolutely similar. They are, therefore, considered the same. The relation of similarity is thus

converted into identity, and the real plurality of resembling qual-
ities in nature is factitiously reduced to a unity of thought; and
this unity obtains a name in which its relativity, not being
expressed, is still further removed from observation.

But the moment we attempt to represent to ourselves any of
these concepts, any of these abstract generali-
Wherein consists the generality of a concept. ties, as absolute objects, by themselves, and
out of relation to any concrete or individual
realities, their relative nature at once reäppears; for we find
it altogether impossible to represent any of the qualities
expressed by a concept, except as attached to some individual
and determinate object; and their whole generality consists in
this—that though we must realize them in thought under some
singular of the class, we may do it under any. Thus, for
example, we can not actually represent the bundle of attributes
contained in the concept *man*, as an absolute object, by itself,
and apart from all that reduces it from a general cognition to
an individual representation. . We can not figure in imagination
any object adequate to the general notion or term *man;* for the
man to be here imagined must be neither tall nor short, neither
fat nor lean, neither black nor white, neither man nor woman,
neither young nor old, but all and yet none of these at once.
The relativity of our concepts is thus shown in the contradic-
tion and absurdity of the opposite hypothesis. *

But it does not from this follow that concepts are mere words
and that there is nothing general in thought
But concepts are not, therefore, mere words. itself. This is not, indeed, held in reality
by any philosopher; for no philosopher has ever denied that
we are capable of apprehending relations, and in particular the
relation of similarity and difference; so that the whole con-
troversy between the conceptualist and nominalist originates in
the ambiguous employment of the same terms to express the
representations of Imagination and the notions or concepts of
the understanding. This is significantly shown by the absolute

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* See Appendix C.

non-existence of the dispute among the philosophers of the
most metaphysical country in Europe.   In Germany, the ques-
tion of nominalism and conceptualism has not been agitated,
and why?   Simply because the German language supplies
terms by which concepts (or notions of thought proper) have
been contradistinguished from the presentations and represent-
ations of the subsidiary faculties.   But this is not a subject on
which I ought at present to have touched, as it is, in truth, for-
eign to the domain of Logic ; and I have only been led now to
recur to it at all, in consequence of some difficulties expressed
to me by members of the class.   All that I wish you now to
understand is—that concepts, as the result of comparison, that
is, of the apprehension and affirmation of a relation, are
necessarily, in their nature relative, and, consequently, not
capable of representation as absolute attributes.

¶ XXIII.   The concept thus formed by an abstraction
of the resembling from the non-resembling qualities of objects,
would again fall back into the confusion and infinitude from
which it has been called out, were it not rendered permanent
XXIII.   Concepts— for consciousness, by being fixed and ratified
(c) Their dependence on in a verbal sign.   Considered in general,
Language. thought and language are reciprocally depend-
ent ; each bears all the imperfections and perfections of the
other ; but without language there could be no knowledge
realized of the essential properties of things, and of the con-
nection of their accidental states.

This also is not a subject of which the consideration properly
belongs to Logic, but a few words may not
The relation of Lan- be inexpedient to make you aware, in gen-
guage to Thought, and
the influence which it eral, of the intimate connections of thought
exerts on our mental and its expression, and of the powerful
operations.
influence which language exerts upon our
mental operations.   Man, in fact, only obtains the use of his
faculties in obtaining the use of speech ; for language is the

indispensable mean of the development of his natural powers, whether intellectual or moral.

For Perception, indeed, for the mere consciousness of the similarities and dissimilarities in the objects perceived, for the apprehension of the causal connection of certain things, and for the application of this knowledge to the attainment of certain ends, no language is necessary ; and it is only the exaggeration of a truth into an error, when philosophers maintain that language is the indispensable condition of even the simpler energies of knowledge. Language is the attribution of signs to our cognitions of things. But as a cognition must have been already there, before it could receive a sign; consequently, that knowledge which is denoted by the formation and application of a word, must have preceded the symbol which denotes it. Speech is thus not the mother, but the godmother, of knowledge. But though, in general, we must hold that lan--guage, as the product and correlative of thought, must be viewed as posterior to the act of thinking itself; on the other hand, it must be admitted, that we could never have risen above the very lowest degrees in the scale of thought, without the aid of signs. A sign is necessary to give stability to our intellectual progress—to establish each step in our advance as a new starting-point for our advance to another beyond.

Language unnecessary in certain mental operations.

A country may be overrun by an armed host, but it is only conquered by the establishment of fortresses. Words are the fortresses of thought. They enable us to realize our dominion over what we have already overrun in thought ; to make every intellectual conquest the basis of operations for others still beyond. Or another illustration : You have all heard of the process of tunneling, of tunneling through a sand-bank. In this operation it is impossible to succeed, unless every foot, nay almost every inch in our progress, be secured by an arch of masonry, before we attempt the excavation of

Mental operations to which language is indispensable, and its relation to these.

another. Now, language is to the mind precisely what the arch is to the tunnel. The power of thinking and the power of excavation are not dependent on the word in the one case, or the mason-work in the other; but without these subsidiaries, neither process could be carried on beyond its rudimentary commencement. Though, therefore, we allow that every movement forward in language must be determined by an antecedent movement forward in thought; still, unless thought be accompanied at each point of its evolution, by a corresponding evolution of language, its further development is arrested. Thus it is, that the higher exertions of the higher faculty of Understanding—the classification of the objects presented and represented by the subsidiary powers in the formation of a hierarchy of notions, the connection of these notions into judgments, the inference of one judgment from another, and, in general, all our consciousness of the relations of the universal to the particular, consequently all science strictly so denominated, and every inductive knowledge of the past and future from the laws of nature :—not only these, but all ascent from the sphere of sense to the sphere of moral and religious intelligence, are, as experience proves, if not altogether impossible without a language, at least possible to a very low degree.

Admitting even that the mind is capable of certain elementary concepts without the fixation and signature of language, still these are but sparks which would twinkle only to expire; and it requires words to give them prominence, and, by enabling us to collect and elaborate them into new concepts, to raise out of what would otherwise be only scattered and transitory scintillations a vivid and enduring light.

B. OF CONCEPTS IN SPECIAL.

In a logical point of view, there are only three possible relations in which concepts can be considered; for the only relations they hold are to their objects, to their subject, or to each other. In relation to their objects, they are considered as inclusive

B. Of Concepts or Notions in special.

of a greater or smaller number of attributes, that is, as applicable to a greater or smaller number of objects; this is technically styled their *Quantity*. In relation to their subject, that is, to the mind itself, they are considered as standing in a higher or lower degree of consciousness; they are more or less clear; they are more or less distinct; this, in like manner, is called their *Quality*. In relation to each other, they are considered as the same or different, coördinated or subordinated to each other; this is their *Relation*, strictly so called.

¶ XXIV. As a concept, or notion, is a thought in which an indefinite plurality of characters is bound up into a unity of consciousness, and applicable to an indefinite plurality of objects, a concept is, therefore, necessarily a quantity, and a quantity varying in amount according to the greater or smaller number of characters of which it is the complement, and the greater or smaller number of things of which it may be said. This quantity is thus of two kinds; as it is either an Intensive or an Extensive. The Internal or Intensive Quantity of a concept is determined by the greater or smaller number of constituent characters contained in it. The External or Extensive Quantity of a concept is determined by the greater or smaller number of classified concepts or realities contained under it.

XXIV. Quantity of Concepts of two kinds, Intensive and Extensive.

The Internal Quantity of a notion, its Intension or Comprehension, is made up of those different attributes of which the concept is the conceived sum; that is, the various characters connected by the concept itself into a single whole in thought. The External Quantity of a notion or its extension is, on the other hand, made up of the number of objects which are thought mediately through a concept. For example, the attributes *rational, sensible, moral,* etc., go to constitute the intension or internal quantity of the concept *man;* whereas the attributes *European, American,*

General Explication.

philosopher, tailor, etc., go to make up a concept of this or that individual man. These two quantities are not convertible. On the contrary, they are in the inverse ratio of each other; the greater the depth or comprehension of a notion the less its breadth or extension, and *vice versâ*. You will observe, likewise, a distinction which has been taken by the best logicians. Both quantities are said *to contain;* but the quantity of extension is said to contain *under* it; the quantity of comprehension is said to contain *in* it.

By the intension, comprehension, or depth of a notion, we think the most qualities of the fewest objects; whereas by the extension or breadth of a concept, we think the fewest qualities of the most objects. In other words, by the former, we say the most of the least; by the latter, the least of the most.

Again you will observe the two following distinctions: the first—the exposition of the Comprehension of a notion is called its *Definition* (a simple notion can not, therefore, be defined); the second—the exposition of the Extension of a notion is called its *Division* (an individual notion can not be divided).

What follows is in further illustration of the paragraph.

Special illustration of Paragraph. A concept is a quantity. Notions or concepts stand in a necessary relation to certain objects, thought through them; for without something to think of, there could exist no thought, no notion, no concept. But in so far as we think an object through a concept, we think it as part of, or as contained under, that concept: and in so far as we think a concept of its object or objects, we think it as a unity containing, actually or potentially, in it a plurality of attributions. Out of the relation of a concept to its object it necessarily results, that a concept is a quantum or quantity; for that which contains one or more units by which it may be measured, is a quantity.

This quantity of two kinds. 1. Intensive. But the quantity of a concept is of two, and two opposite, kinds. Considered internally, that is, as a unity which may, and generally does, contain in it a plurality of parts or component attri-

butes, a concept has a certain quantity, which may be called its *internal* or *intensive* quantity. This is generally called its *comprehension*, sometimes its *depth*, βάθος, and its *quantitas complexus.* Here, the parts, that is, the several attributes or characters, which go to constitute the total concept, are said to be contained *in* it. For example, the concept *man* is composed of two constituent parts or attributes, that is, of two partial concepts—*rational* and *animal;* for the characters *rational* and *animal* are only an analytical expression of the synthetic unity of the concept *man.* But each of these partial concepts, which together make up the comprehension of the total concept *man,* are themselves wholes, made up in like manner of parts. To take only the concept *animal*—this comprehends in it, as parts, *living* and *sensitive* and *organized,* for a living and sentient organism may be considered as an analytical development of the constituents of the synthetic unity *animal.* But each of these, again, is a concept, comprehending and made up of parts; and these parts, again, are relative wholes, divisible· into other constituent concepts; nor need we stop in our analysis till we reach attributes which, as simple, stand as a primary or ultimate element, into which the series can be resolved. Now, you will observe, that as the parts of the parts are parts of the whole, the concept *man,* as immediately comprehending the concepts *rational* and *animal,* mediately comprehends their parts, and the parts of their parts, to the end of the evolution. Thus, we can say, not only that *man* is an *animal,* but that he is a *living being,* a *sentient being,* etc. The logical axiom, *Nota notæ est nota rei ipsius,* or, as otherwise expressed, *Prædicatum prædicati est prædicatum subjecti*—is only a special ﹅enunciation of the general principle, that the part of a part is a part of the whole. You will, hereafter, see that the Comprehension of notions affords one of the two great branches of reasoning, which, though marvelously overlooked by logicians, is at least of equal importance with that which they have exclusively developed, and which is founded on the other

kind of quantity exhibited by concepts, and to which I now proceed.

But a concept may also be considered externally, that is, as a unity which contains under it a plurality of classifying attributes or subordinate concepts, and, in this respect, it has another quantity which may be called its *external* or *extensive* quantity. This is commonly called its *extension*; sometimes its *sphere* or *domain*, *sphœra*, *regio*, *quantitas ambitus*; and, by the Greek logicians, its *breadth* or *latitude*, πλάτος. Here the parts which the total concept contains, are said to be contained *under* it, because, holding the relation to it of the particular to the general, they are subordinated or ranged under it. For example, the concepts *man*, *horse*, *dog*, etc., are contained under the more general concept *animal*—the concepts *triangle*, *square*, *circle*, *rhombus*, *rhomboid*, etc., are contained under the more general concept *figure*; inasmuch as the subordinate concepts can each or any be thought through the higher or more general. But as each of these subordinate concepts is itself a whole or general, which contains under it parts or more particular concepts, it follows, again, on the axiom or self-evident truth that a part of a part is a part of the whole—an axiom which, you will hereafter see, constitutes the one principle of all Deductive reasoning—it follows, on this axiom, that whatever is contained under the partial or more particular concept, is contained under the total or more general concept. Thus, for example, *triangle* is contained under *figure*; all, therefore, that is contained under *triangle*, as *rectangled triangle*, *equilateral triangle*, etc., will, likewise, be contained under *figure*, by which we may, accordingly, think and describe them.

Such, in general, is what is meant by the two quantities of concepts—their Comprehension and Extension.

Intensive and Extensive quantities are opposed to each other. But these quantities are not only different, they are opposed, and so opposed, that though each supposes the other as the condition of

2. Extensive.

its own existence, still, however, within the limits of conjunct, of correlative existence, they stand in an inverse ratio to each other—the maximum of the one being the minimum of the other.

¶ **XXV.** A notion is intensively great in proportion to the greater number, and intensively small in pro-

XXV. Law regulating the mutual relations of Extension and Comprehension.

portion to the smaller number, of determinations or attributes contained in it. Is the Comprehension of a concept a minimum, that is, is the concept one in which a plurality of attributes can no longer be distinguished, it is called *simple;* whereas, inasmuch as its attributes still admit of discrimination, it is called *complex* or *compound.*

A notion is extensively great in proportion to the greater number, and extensively small in proportion to the smaller number, of determinations or attributes it contains under it. When the Extension of a concept becomes a minimum, that is, when it contains no other notions under it, it is called an *individual.*

These two quantities stand always in an inverse ratio to each other: For the greater the Comprehension of a concept, the less is its Extension; and the greater its Extension, the less its Comprehension.

To illustrate this: When I take out of a concept, that is,

Illustration

abstract from one or more of its attributes, I diminish its comprehension. Thus, when from the concept *man,* equivalent to *rational animal,* I abstract from the attribute or determination *rational,* I lessen its internal quantity. But by this diminution of its comprehension I give it a wider extension; for what remains is the concept *animal,* and the concept *animal* embraces under it a far greater number of objects than the concept *man.*

¶ **XXVI.** Of the logical processes by which these counter

quantities of concepts are amplified—the one which amplifies
the Comprehension is called *Determination*,
and sometimes called *Concretion*, the other
which amplifies the Extension is called *Ab-
straction* or *Generalization*. *Definition* and
Division are severally the resolution of the
Comprehension and of the Extension of notions, into their parts.
A Simple notion can not be defined ; an Individual notion can
not be divided.

XXVI. Processes by
which the Comprehen-
sion and Extension of
Notions are amplified
and resolved.

The reason of this opposition of the two quantities is mani-
fest in a moment, from the consideration of
their several natures. The comprehension
of a concept is nothing more than a sum or
complement of the distinguishing characters, attributes, of
which the concept is made up ; and the extension of a concept
is nothing more than the sum or comple-
ment of the objects themselves, whose resem-
bling characters were abstracted to constitute
the concept. Now, it is evident, that the
more distinctive characters the concept con-
tains, the more minutely it will distinguish and determine, and
that if it contain a plenum of distinctive characters, it must
contain the distinctive, the determining, characters of some
individual object. How do the two quantities now stand ? In
regard to the comprehension or depth, it is evident, that it is
here at its maximum, the concept being a complement of the
whole attributes of an individual object, which, by these attri-
butes, it thinks and discriminates from every other. On the
contrary, the extension or breadth of the concept is here at its
minimum ; for, as the extension is great in proportion to the
number of objects to which the concept can be applied, and as
the object is here only an individual one, it is evident that it
could not be less, without ceasing to be at all. Again, to
reverse the process : throwing out of the comprehension of the
concept, that is, abstracting from those attributes, which belong-

Illustration of the two
foregoing paragraphs.

Comprehension and
Extension are opposed
in an inverse ratio to
each other.

ing exclusively to, exclusively distinguish, the individual—we at once diminish the comprehension, by reducing the sum of its attributes, and amplify the extension of the concept, by bringing within its sphere all the objects, which the characteristics, now thrown out of the comprehension, had previously excluded from the extension. Continuing the process, by abstraction we throw out of the sum of qualities constituting the comprehension, other discriminating attributes, and forthwith the extension is proportionally amplified, by the entrance into its sphere of all those objects which had previously been debarred by the determining characteristics last discarded. Thus proceeding, and at each step ejecting from the comprehension those characters which are found the proximate impediments to the amplification of the extension of the concept, we at each step diminish the former quantity precisely as we increase the latter; till, at last, we arrive at that concept which is the necessary constituent of every other—at that concept which all comprehension and all extension must equally contain, but in which comprehension is at its minimum, extension at its maximum—I mean the concept of *Being* or *Existence*.

We have thus seen, that the maximum of comprehension and the minimum of extension are found in the concept of an individual—that the maximum of extension and the minimum of comprehension are found in the concept of the absolutely simple, that is, in the concept of *existence*. Now, comprehension and extension, as quantities, are wholes; for wholes are only the complement of all their parts, and as wholes are only by us clearly comprehended as we distinctly comprehend their parts, it follows: 1. That comprehension and extension may each be analyzed into its parts; and, 2. That this analysis will afford the mean by which each of these quantities can be clearly and distinctly understood. But as the two quantities are of an opposite nature, it is manifest, that the two processes of analysis will, likewise, be opposed. The analysis of the intensive or comprehensive

Definition and Division are the processes by which Comprehension and Extension of Concepts are resolved.

6

quantity of concepts, that is, their depth, is accomplished by Definition; that of their extensive quantity, or breadth, by division. On Definition and Division I at present touch, not to consider them in themselves or on their own account, that is, as the methods of clear and of distinct thinking, for this will form the matter of a special discussion in the Second Part of Logic or Methodology, but simply in so far as it is requisite to speak of them in illustration of the general nature of our concepts.

The expository or explanatory analysis of a concept, considered as an intensive whole or quantum, if properly effected, is done by its resolution into two concepts of which it is proximately compounded, that is, into the higher concept under which it immediately stands, and into the concept which affords the character by which it is distinguished from the other coördinate concepts under that higher concept. This is its definition; that is, in logical language, its exposition by an analysis into its Genus and Differential Quality—the genus being the higher concept, under which it stands; the differential quality the lower concept, by which it is distinguished from the other concepts subordinate to the genus, and on a level or coördinate with itself, and which, in logical language, are called *Species*. For example : if we attempt an expository or explanatory analysis of the concept *man*, considered as an intensive quantity or complexus of attributes, we analyze it into *animal*, this being the higher concept or genus, under which it stands; and into *rational*, the attribute of reason being the characteristic or differential quality, by which *man* is distinguished from the other concepts or species which stand coördinated with itself, under the genus *animal*—that is, *irrational animal* or *brute*.

Definition Illustrated.

Here you will observe, that though the analysis be of the comprehension, yet it is regulated by the extension; the extension regulating the order in which the comprehension is resolved into its parts.

The expository analysis of a concept, an extensive whole or

quantum, is directly opposed to the preceding, to which it
Division. is correlative. It takes the higher concept,
and, if conducted aright, resolves it into its
proximately lower concepts, by adding attributes which afford
their distinguishing characters or differences. This is division:
Thus, for example, taking the highest concept, that of *ens* or
existence, by adding to it the differential concepts *per se* or *sub-
stantial*, and *non per se* or *accidental*, we have *substantial exist-
ence* or *existence per se*, equivalent to *substance*, and *acciden'al
existence* or *existence non per se*, equivalent to *accident*. We
may then divide substance by *simple* and *not-simple*, equivalent
to *compound*, and again simple by *material* and *non-material*,
equivalent to *immaterial*, equivalent to *spiritual;* and matter
or material substance by *organized* and *not-organized*, equivalent
to *brute matter*. *Organized* matter we may divide by *sentient*
or *animal*, and *non-sentient* or *vegetable*. *Animal* we may divide
by *rational* or *irrational*, and so on, till we reach a concept which,
as that of an individual object, is, in fact, not a general concept,
but only in propriety a singular representation.

Thus, it is manifest, that, as Definition is the analysis of a
The Indefinable and
Indivisible. complex concept into its component parts or
attributes, if a concept be simple, that is, if
it contain in it only a single attribute. it must
be indefinable ; and again, that as Division is the analysis of a
higher or more general concept into others lower and less
general, if a concept be an individual, that is, only a bundle of
individual qualities, it is indivisible, is, in fact, not a proper or
abstract concept at all, but only a concrete representation of
Imagination.

¶ XXVII. A concept or notion is the unity in conscious-
XXVII. The Quality
of a Concept consists in
its logical Perfection or
Imperfection. ness of a certain plurality of attributes, and
it, consequently, supposes the power of think-
ing these, both separately and together. But
as there are many gradations in the conscious-

ness with which the characters of a concept can be thought severally and in conjunction, there will consequently be many gradations in the actual Perfection or Imperfection of a notion. It is this perfection or imperfection which constitutes the logical Quality of a concept.

It is thus the greater or smaller degree of consciousness which accompanies the concept and its object, that determines its quality, and according to which it is called logically perfect or logically imperfect. Now, there may be distinguished two degrees of this logical perfection, the nature of which is summarily expressed in the following paragraph:

¶ XXVIII. There are two degrees of the logical perfec-
tion of concepts—viz.: their *Clearness* and
their *Distinctness*, and, consequently, two
opposite degrees of their corresponding im-
perfection—viz.: their *Obscurity* and their
Indistinctness. These four qualities express
the perfection and imperfection of concepts
in extremes. But between these extremes there lie an indefi-
nite number of intermediate degrees.

XXVIII. The two de-
grees of the logical Per-
fection and Imperfec-
tion of Concepts—their
Clearness and Distinct-
ness, and their Obscu-
rity and Indistinctness.

A concept is said to be *clear* (*clara*), when the degree of consciousness is such as enables us to distinguish it as a whole from others; and *obscure* (*obscura*), when the degree of con-sciousness is insufficient to accomplish this. A concept is said to be *distinct* (*distincta, perspicua*), when the degree of con-sciousness is such as enables us to discriminate from each other the several characters, or constituent parts of which the concept is the sum; and *indistinct* or *confused* (*indistincta, confusa, imperspicua*), when the amount of consciousness requisite for this is wanting. *Confused* (*confusa*) may be employed as the genus including *obscure* and *indistinct*.

The expressions *clearness* and *obscurity*, and *distinctness* and

indistinctness, as applied to concepts, originally denote certain
modifications of vision ; from vision they were
analogically extended to the other senses, to
imagination, and finally to thought. It may,
therefore, enable us the better to compre-
hend their secondary application, to consider

their primitive. To Leibnitz we owe the precise distinction of
concepts into clear and distinct, and from him I borrow the
following illustration. In darkness, the complete obscurity of
night, we see nothing—there is no perception, no discrimina-
tion of objects. As the light dawns, the obscurity diminishes,
the deep and uniform sensation of darkness is modified—we are
conscious of a change—we see something, but are still unable
to distinguish its features—we know not what it is. As the
light increases, the outlines of wholes begin to appear, but still
not with a distinctness sufficient to allow us to perceive them
completely ; but when this is rendered possible, by the rising
intensity of the light, we are then said to see clearly. We
then recognize mountains, plains, houses, trees, animals, etc.,
that is, we discriminate these objects as wholes, as unities, from
each other. But their parts—the manifold of which these
unities are the sum—their parts still lose themselves in each
other, they are still but indistinctly visible. At length, when
the daylight has fully sprung, we are enabled likewise to dis-
criminate their parts ; we now see distinctly what lies around
us. But still we see as yet only the wholes which lie proxi-
mately around us, and of these only the parts which possess a
certain size. The more distant wholes, and the smaller parts
of nearer wholes, are still seen by us only in their conjoint
result, only as they concur in making up that whole which is for
us a visible minimum. Thus it is, that in the distant forest, or
on the distant hill, we perceive a green surface ; but we see not
the several leaves, which in the one, nor the several blades of
grass, which in the other, each contributes its effect to produce
that amount of impression which our consciousness requires.
Thus it is, that all which we do perceive is made up of parts

which we do not perceive, and consciousness is itself a comple-
ment of impressions, which lie beyond its apprehension. Clear-
ness and distinctness are thus only relative. For between the
extreme of obscurity and the extreme of distinctness, there are
in vision an infinity of intermediate degrees. Now, the same
thing occurs in thought. For we may either be conscious only
of the concept in general, or we may also be conscious of its
various constituent attributes, or both the concept and its parts
may be lost in themselves to consciousness, and only recognized
to exist by effects which indirectly evidence their existence.

The perfection of a notion, as I said, is contained in two
degrees or in two virtues—viz., in its clear-
*Clearness and obscu-
rity as in concepts.*
ness and in its distinctness; and, of course,
the opposite vices of obscurity and indis-
tinctness afford two degrees or two vices, constituting its
imperfection. A concept is said to be *clear*, when the degree
of consciousness by which it is accompanied is sufficient to
discriminate what we think in and through it, from what we
think in and through other notions; whereas if the degree of
consciousness be so remiss that this and other concepts run into
each other, in that case the notion is said to be *obscure*. It is evi-
dent that clearness and obscurity admit of various degrees; each
being capable of almost infinite gradations, according as the object
of the notion is discriminated with greater or less vivacity or pre-
cision from the objects of other notions. A
*The absolutely clear
and absolutely obscure.*
concept is *absolutely clear*, when its object is
distinguished from all other objects; a concept
is *absolutely obscure*, when its object can be distinguished from no
other object. But it is only the absolutely clear and absolutely
obscure which stand opposed as contradictory extremes; for
the same notion can at once be relatively or comparatively clear,
and relatively or comparatively obscure. Absolutely obscure
notions, that is, concepts whose objects can be distinguished
from nothing else, exist only in theory; an absolutely obscure
notion being, in fact, no notion at all. For it is of the very
essence of a concept, that its object should, to a certain degree

at least, be comprehended in its peculiar, consequently in its distinguishing characteristics. But on the other hand, of notions absolutely clear, that is, notions whose objects can not possibly be confounded with aught else, whether known or unknown—of such notions a limited intelligence is possessed of very few, and, consequently, our human concepts are, properly, only a mixture of the opposite qualities;—*clear or obscure* as applied to them, meaning only that the one quality or the other is the preponderant. In a logical relation, the illustration of notions consists in the raising them from a preponderant obscurity to a preponderant clearness—or from a lower degree to a higher. So much for the quality of clearness or obscurity considered in itself.

But a Clear concept may either be Distinct or Indistinct; *The Distinctness and Indistinctness of Concepts.* the distinctness and indistinctness of concepts are therefore to be considered apart from their clearness and obscurity.

We have seen that a concept is clear, when we are able to *The distinction in itself.* recognize it as different from other concepts. But we may discriminate a whole from other wholes, we may discriminate a concept from other concepts, though we have only a confused knowledge of the parts of which that whole, or of the characters of which that concept, is made up. This may be illustrated by the analogy of our Perceptive and Representative Faculties. We are all acquainted *Illustrated by the analogy of Perception and Representation.* with many, say a thousand individuals; that is, we recognize such and such a countenance as the countenance of John, and as not the countenance of James, Thomas, Richard, or any of the other nine hundred and ninety-nine. This we do with a clear and certain knowledge. But the countenances, which we thus distinguish from each other, are, each of them, a complement made up of a great number of separate traits or features; and it might, at first view, be supposed that, as a whole is only the sum of its parts, a clear cognition of a whole countenance can only be realized through a distinct knowledge of each of its constituent features.

But the slightest consideration will prove that this is not the case. For how few of us are able to say of any, the most familiar face, what are the particular traits which go to form the general result; and yet, on that account, we hesitate neither in regard to our own knowledge of an individual, nor in regard to the knowledge possessed by others. Suppose a witness be adduced in a court of justice to prove the identity or non-identity of a certain individual with the perpetrator of a certain crime, the commission of which he had chanced to see—would the counsel be allowed to invalidate the credibility of the witness by, first of all, requiring him to specify the various elements of which the total likeness of the accused was compounded, and then by showing that, as the witness either could not specify the several traits, or specified what did not agree with the features of the accused, he was, therefore, incompetent to prove the identity or non-identity required? This would not be allowed. For the court would hold that a man might have a clear perception and a clear representation of a face and figure, of which, however, he had not separately considered, and could not separately image to himself, the constituent elements. Thus, even the judicial determination of life and death supposes, as real, the difference between a clear and a distinct knowledge: for a distinct knowledge lies in the knowledge of the constituent parts; while a clear knowledge is only of the constituted whole.

The judicial determination between life and death supposes the difference between a clear and distinct knowledge.

Continuing our illustrations from the human countenance: we all have a clear knowledge of any face which we have seen, but few of us have distinct knowledge even of those with which we are familiar; but the painter who, having looked upon a countenance, can retire and reproduce its likeness in detail, has necessarily both a clear and distinct knowledge of it. Now, what is thus the case with perceptions and representations, is equally the case with notions. We may be able clearly to discriminate one concept from another, although the degree of

Further illustration from the human countenance.

consciousness does not enable us distinctly to discriminate the various component characters of either concept from each other. The Clearness and Distinctness of a notion are thus not the same; the former involves merely the power of distinguishing the total objects of our notions from each other; the latter involves the power of distinguishing the several characters, the several attributes, of which that object is the sum. In the former the unity, in the latter the multiplicity, of the notion is called into relief.

The distinctness of a concept supposes, however, the Clearness; and may, therefore, be regarded as a higher degree of the same quality or perfection. To the distinctness of a notion, over and above its general clearness, there are required three conditions—1°. The clear apprehension of its several characters or component parts; 2°. The clear contrast or discrimination of these; and, 3°. The clear recognition of the nexus by which the several parts are bound up into a unity or whole.

Special conditions of the Distinctness of a Concept, and of its degrees.

As the clearness, so the distinctness, of a notion is susceptible of many degrees. A concept may be called *distinct*, when it involves the amount of consciousness required to discriminate from each other its principal characters; but it is so much the more distinct, 1°. In proportion to the greater number of the characters apprehended; 2°. In proportion to the greater clearness of their discrimination; and, 3°. In proportion to the precision with which the mode of their connection is recognized. But the greater distinctness is not exclusively or even principally determined by the greater number of the clearly apprehended characters; it depends still more on their superior importance. In particular, it is of moment whether the characters be positive or negative, internal or external, permanent or transitory, peculiar or common, essential or accidental, original or derived. From the mere consideration of the differences subsisting between attributes, there emerge three rules to be attended to in bestowing on a concept its requisite

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distinctness. In the first place, we should endeavor to discover the positive characters of the object conceived; as it is our purpose to know what the object is, and not what it is not. When, however, as is not unfrequently the case, it is not at once easy to discover what the positive attributes are, our endeavor should be first directed to the detection of the negative; and this not only because it is always an advance in knowledge, when we ascertain what an object is not, but, likewise, because the discovery of the negative characters conducts us frequently to a discovery of the positive.

In the second place, among the positive qualities we should seek out the intrinsic and permanent before the extrinsic and transitory; for the former give us a purer and more determinate knowledge of an object, though this object may likewise, at the same time, present many external relations and mutable modifications. Among the permanent attributes, the proper or peculiar always merit a preference, if for no other reason, because through them, and not through the common qualities, can the proper or peculiar nature of the object become known to us.

In the third place, among the permanent characters we ought first to hunt out the necessary or essential, and then to descend from them to the contingent or accidental; and this is not only because we thus give order and connection to our notions, but, likewise, because the contingent characters are frequently only to be comprehended through the necessary.

But before leaving this part of our subject, it may be proper to illustrate the distinction of Clear and Distinct notions by one or two concrete examples. Of many things we have clear but not distinct notions. Thus, we have a clear, but not a distinct, notion of colors, sounds, tastes, smells, etc. For we are fully able to distinguish red from white, to distinguish an acute from a grave note, the voice of a friend from that of a stranger, the scent of roses from that of onions, the flavor of sugar from that of vinegar; but by what plurality of sep-

The distinction of Clear and Distinct notions illustrated by concrete examples.

arate and enunciable characters is this discrimination made?
It is because we are unable to do this, that we can not describe
such perceptions and representations to others.

"If you ask of me," says St. Augustine, "what is Time, I
know not; if you do not ask me, I know." What does this
mean? Simply that he had a clear, but not a distinct, notion
of Time.

Of a triangle we have a clear notion, when we distinguish a
triangle from other figures, without specially considering the
characters which constitute it what it is. But when we think
it as a portion of space bounded by three lines, as a figure
whose three angles are equal to two right angles, etc., then we
obtain of it a distinct concept.

We now come to the consideration of the question—How does
the Distinctness of a concept stand affected
by the two quantities of a concept?—and in
reference to this point I would, in the first
place, dictate to you the following paragraph:

How the Distinctness of a Concept is affected by the two quantities of a Concept.

¶ XXIX. As a concept is a plurality of characters bound
up into unity, and as that plurality is con-
tained partly in its Intensive, partly under
its Extensive, quantity, its Distinctness is, in
like manner, in relation to these quantities, partly an Internal
or Intensive, partly an External or Extensive Distinctness.

XXIX. Distinctness, Internal and External.

In explanation of this, it is to be observed, that, as the dis-
tinctness of a concept is contained in the clear apprehension
of the various attributes of which it is the sum, as it is the
sum of these attributes in two opposite rela-
tions, which constitute, in fact, two opposite
quantities or wholes, and as these wholes are severally capable
of illustration by analysis, it follows, that each of these
analyses will contribute its peculiar share to the general dis-
tinctness of the concept. Thus, if the distinctness of a notion
bears reference to that plurality which constitutes its com-

Explication.

prehension, in other words, to that which is contained *in* the concept, the distinctness is denominated an *internal* or *intensive* distinctness, or distinctness of *comprehension*. On the other hand, if the distinctness refers to that plurality which constitutes the extension of the notion, in other words, to what is contained *under* it, in that case, the distinctness is called an *external* or *extensive* distinctness, a distinctness of *extension*. It is only when a notion combines in it both of these species of distinctness, it is only when its parts have been analyzed in reference to the two quantities, that it reaches the highest degree of distinctness and of perfection.

The Internal Distinctness of a notion is accomplished by

Definition and Division.

Exposition or Definition, that is, by the enumeration of the characters or partial notions contained in it; the External Distinctness, again, of a notion is accomplished through Division, that is, through the enumeration of the objects which are contained under it. Thus the concept *man* is rendered intensively more distinct, when we declare that man is a *rational animal;* it is rendered extensively more distinct, when we declare that man is partly *male*, partly *female man*. In the former case, we resolve the concept man into its several characters—into its partial or constituent attributes; in the latter, we resolve it into its subordinate concepts, or inferior genera. In simple

Simple notions admit of an extensive, individual notions of an intensive, distinctness.

notions, there is thus possible an extensive, but not an intensive, distinctness; in individual notions, there is possible an intensive, but not an extensive, distinctness. Thus the concepts *existence, green, sweet,* etc., though, as absolutely or relatively simple, their comprehension can not be analyzed into any constituent attributes, and they do not, therefore, admit of definition; still it can not be said that they are incapable of being rendered more distinct. For do we not analyze the pluralities of which these concepts are the sum, when we say, that existence is either ideal or real, that green is a yellowish or a bluish green, that sweet is a pungent or a mawkish sweet? and do

we not, by this analysis, attain a greater degree of logical perfection, than when we think them only clearly and as wholes? A

The highest point of Distinctness of a Concept.

concept has, therefore, attained its highest point of distinctness, when there is such a consciousness of its characters that, in rendering its comprehension distinct, we touch on notions which, as simple, admit of no definition, and, in rendering its extension distinct, we touch on notions which, as individual, admit of no ulterior division. It is true, indeed, that a distinctness of this degree is one which is only ideal; that is, one to which we are always approximating, but which we never are able actually to reach. In order to approach as near as possible to this ideal, we must always inquire, what is contained in, and what under, a notion, and endeavor to obtain a distinct consciousness of it in both relations. What, in this research, first presents itself we must again analyze anew, with reference always both to comprehension and to extension; and descending from the higher to the lower, from the greater to the less, we ought to stop only when our process is arrested in the individual or in the simple.

¶ XXX. As a notion or concept is the factitious whole or unity made up of a plurality of attributes—

XXX. Imperfections of Concepts.

a whole too often of a very complex multiplicity; and as this multiplicity is only mentally held together, inasmuch as the concept is fixed and ratified in a sign or word; it frequently happens, that, in its employment, the word does not suggest the whole amount of thought for which it is the adequate expression, but, on the contrary, we frequently give and take the sign, either with an obscure or indistinct consciousness of its meaning, or even without an actual consciousness of its signification at all.

This liability to the vices of Obscurity and Indistinctness arises, 1°. From the very nature of a con-

Illustration.

cept, which is the binding up of a multi-

plicity in unity; and 2°. From its dependence upon language, as the necessary condition of its existence and stability. In consequence of this, when a notion is of a very complex and heterogeneous composition, we are frequently wont to use the term by which it is denoted, without a clear or distinct consciousness of the various characters of which the notion is the sum; and thus it is, that we both give and take words without any, or, at least, without the adequate complement of thought. I may exemplify this: You are aware, that in countries where bank-notes have not superseded the use of the precious metals, large payments are made in bags of money, purporting to contain a certain number of a certain denomination of coin, or, at least, a certain amount in value. Now, these bags are often sealed up and passed from one person to another, without the tedious process, at each transference, of counting out their contents, and this upon the faith, that, if examined, they will be found actually to contain the number of pieces for which they are marked, and for which they pass current. In this state of matters, it is, however, evident, that many errors or frauds may be committed, and that a bag may be given and taken in payment for one sum, which contains another, or which, in fact, may not even contain any money at all. Now the case is similar in regard to notions. As the sealed bag or *rouleau* testifies to the enumerated sum, and gives unity to what would otherwise be an unconnected multitude of pieces, each only representing its separate value; so the sign or word proves and ratifies the existence of a concept, that is, it vouches the tying up of a certain number of attributes or characters in a single concept—attributes which would otherwise exist to us only as a multitude of separate and unconnected representations of value. So far the analogy is manifest; but it is only general. The bag, the guaranteed sum, and the constituent coins, represent in a still more proximate manner the term, the concept, and the constituent characters. For in regard to each, we may do one of two things. On the one hand, we may test the bag, that is, open it, and ascertain the

accuracy of its stated value, by counting out the pieces which it purports to contain; or we may accept and pass the bag, without such a critical enumeration. In the other case, we may test the general term, prove that it is valid for the amount and quality of thought of which it is the sign, by spreading out in consciousness the various characters of which the concept professes to be the complement; or we may take and give the term without such an evolution.

It is evident from this, that notions or concepts are peculiarly liable to great vagueness and ambiguity, and that their symbols are liable to be passed about without the proper kind, or the adequate amount, of thought.

I now proceed to the third and last Relation of Concepts—that of concepts to each other. The two former relations of notions—to their objects and to their subject—gave their Quantity and their Quality. This, the relation of notions to each other, gives what is emphatically and strictly denominated their *Relation*. In this rigorous signification, the Relation of Concepts may be thus defined.

¶ XXXI. The Relation proper of notions consists in those determinations or attributes which belong to them, not viewed as apart and in themselves, but as reciprocally compared. Concepts can only be compared together with reference, either, 1°. To their Extension; or, 2°. To their Comprehension. All their relations are, therefore, dependent on the one or on the other of these quantities.

XXXI. Reciprocal Relations of Concepts.

¶ XXXII. As dependent upon Extension, concepts stand to each other in the five mutual relations, 1°. Of Exclusion; 2°. Of Coëxtension; 3°. Of Subordination; 4°. Of Coördination; and 5°. Of Intersection.

XXXII. Under Extension.

1. One concept excludes another, when no part of the one coincides with any part of the other. 2. One concept is coëx-

tensive with another, when each has the same number of sub-
ordinate concepts under it. 3. One concept is subordinate to
another (which may be called the *Superordinate*) when the
former is included within, or makes a part of, the sphere or
extension of the latter. 4. Two or more concepts are coördi-
nated, when each excludes the other from its sphere, but when
both go immediately to make up the extension of a third con-
cept, to which they are cosubordinate. 5. Concepts intersect
each other, when the sphere of the one is partially contained
in the sphere of the other.

Of Exclusion, *horse, syllogism*, are examples : there is no
absolute exclusion.

Examples of the five mutual relations of Concepts. As examples of Coëxtension—the concepts *living being*, and *organized beings*, may be given. For, using the term *life* as applicable
to plants as well as animals, there is nothing living which is
not organized, and nothing organized which is not living.
This reciprocal relation will be represented by two circles cov-
ering each other, or by two lines of equal length and in posi-
tive relations.

As examples of Subordination and Coördination—*man, dog,
horse*, stand, as correlatives, in subordination to the concept
animal, and, as reciprocal correlatives, in coördination with
each other.

What I would call the reciprocal relation of Intersection,
takes place between concepts when their spheres cross or cut
each other, that is, fall partly within, partly without each other.
Thus, the concept *black* and the concept *heavy* mutually inter-
sect each other, for of these some black things are heavy, some
not, and some heavy things are black, some not.

Of these relations, those of Subordination and Coördination
are of principal importance, as on them
Subordination and Coördination of prin- cipal importance. reposes the whole system of classification ;
and to them alone it is, therefore, necessary
to accord a more particular consideration.

Under the Subordination of notions, there are various terms to express the different modes of this rela-

Terms expressive of the different modes of the relation of Subordination. tion; these it is necessary that you should now learn and hereafter bear in mind, for they form an essential part of the language of Logic, and will come frequently, in the sequel, to be employed in considering the analysis of Reasonings.

¶ XXXIII. Of notions which stand to each other in the relations of Subordination—the one is the

XXXIII. Superior and Inferior, Broader and Narrower notions. Higher or *Superior* (*notio, conceptus, superior*), the other the *Lower* or *Inferior* (*notio, conceptus, inferior*). The superior notion is likewise called the *Wider* or *Broader* (*latior*), the inferior is likewise called the *Narrower* (*angustior*).

The meaning of these expressions is sufficiently manifest. A notion is called the *higher* or *superior*, inas-

Explication. much as it is viewed as standing over another in the relation of subordination—as including it within its domain or sphere; and a correlative notion is called the *lower* or *inferior*, as thus standing under a superior. Again, the higher notion is called the *wider* or *broader*, as containing under it a greater number of things; the lower is called the *narrower*, as containing under it a smaller number.

¶ XXXIV. The higher or wider concept is called, in contrast to the lower or narrower, a *Universal*

XXXIV. Universal and Particular notions. or *General Notion* (νόημα καθόλου, *notio, conceptus, universalis, generalis*); the lower or narrower concept, in contrast to the higher or wider, a *Particular Notion*, νόημα μερικόν, *notio, conceptus particularis*.

The meaning of these expressions, likewise, requires no illustration. A notion is called *universal*,

Explication. inasmuch as it is considered as binding up a

multitude of parts or inferior concepts into the unity of a whole; for *universus* means *in unum versus* or *ad unum versus*, that is, *many turned into one*, or *many regarded as one*, and *universal* is employed to denote the attribution of this relation to objects. A notion is called *particular*, inasmuch as it is considered as one of the parts of a higher concept or whole.

¶ XXXV. A superior concept, inasmuch as it constitutes a common attribute or character for a number of inferior concepts, is called a *General Notion* (νόημα καθόλου, *notio conceptus generalis*), or, in a single a word, a *Genus* (γένος, *genus*). A notion, inasmuch as it is considered as at once affording a common attribution for a certain

XXXV. Genus and Species.

complement of inferior concepts or individual objects, and as itself an inferior concept, contained under a higher, is called a *Special Notion* (νόημα εἰδικόν, *notio, conceptus, specialis*), or, in a single word, a *Species* (εἶδος, *species*). The abstraction which carries up species into genera, is called, in that respect, *Generification*, or, more loosely, *Generalization*. The determination which divides a genus into its species is called, in that respect, *Specification*. Genera and Species are both called *Classes;* and the arrangement of things under them is, therefore, *Classification*.

It is manifest that the distinction into Genera and Species is a merely relative distinction; as the same

Explication. The distinction of Genus and Species merely relative.

notion is, in one respect, a genus, in another respect, a species. For except a notion has no higher notion, that is, except it be itself the widest or most universal notion, it may always be regarded as subordinated to another; and, in so far as it is actually thus regarded, it is a species. Again, every notion, except that which has under it only individuals, is, in so far as it is thus viewed, a genus. For example, the notion *triangle*, if viewed in relation to the notion of *rectilineal figure*, is a species as is likewise *rectilineal figure* itself, as viewed in relation

to *figure* simply.   Again, the concept *triangle* is a genus, when viewed in reference to the concepts—*right-angled triangle*, *acute-angled triangle*, etc.   A right-angled triangle is, however, only a species, and not possibly a genus, if under it be necessarily included individuals alone.   But, in point of fact, it is impossible to reach in theory any lowest species; for we can always conceive some difference by which any concept may be divided *ad infinitum*.   This, however, as it is only a speculative curiosity, like the infinitesimal divisibility of matter, may be thrown out of view in relation to practice; and, therefore, the definition, by Porphyry and logicians in general, of the lowest species (of which I am immediately to speak), is practically correct, even though it can not be vindicated against theoretical objections.   On the other hand, we soon and easily reach the highest genus, which is given in τὸ ὄν, *ens aliquid*, *being*, *thing*, *something*, etc., which are only various expressions of the same absolute universality.   Out of these conditions there arise certain denominations of concepts, which it is, likewise, necessary that you be made aware of.

In regard to the terms *Generification* and *Specification*, **Generification and Specification—what.** these are limited expressions for the processes of Abstraction and Determination, considered in a particular relation.   Abstraction and Determination, you will recollect, we have already spoken of in general; it will, therefore, be only necessary to say a very few words in reference to them, as the several operations by which out of species, we evolve genera, and out of genera we evolve species.   And first, in regard to Abstraction and Generification.   In every complex notion, we can **Generification.** limit our attention to its constituent characters, to the exclusion of some one.   We thus think away from this one—we abstract from it.   Now, the concept which remains, that is, the fasciculus of thought *minus* the one character which we have thrown out, is, in relation to the original—the entire concept, the next higher—the proximately superior notion.   But a concept and a next higher concept are to each

other as species and genus. The process of Abstraction, therefore, by which out of a proximately lower we evolve a proximately higher concept, is, when we speak with logical precision, called the process of *Generification*.

Take, for example, the concept *man*. This concept is proximately composed of the two concepts or constituent characters—*animal* and *rational being*. If we think either of these characters away from the other, we shall have in that other a proximately higher concept, to which the concept *man* stands in the relation of a species to its genus. If we abstract from *animal*, then *man* will stand as a species in subordination to the genus *rational being*, and the concept *animal* will then afford only a difference to distinguish *man* as a coördinate species from *immaterial intelligences*. If, on the other hand, we abstract from *rational being*, then *man* will stand as a species in subordination to the genus *animal*, having for a coördinate species *irrational animal*. Such is the process of Generification. Now for the converse process of Specification.

Every series of concepts which has been obtained by abstraction,

Specification.

tion, may be reproduced in an inverted order, when, descending from the highest notion, we, step by step, add on the several characters from which we had abstracted in our ascent. This process, as you remember, is called *Determination*—a very appropriate expression, inasmuch as by each character or attribute which we add on, we limit or determine, more and more, the abstract vagueness or extension of the notion; until, at last, if every attribute be annexed, the sum of attributes contained in the notion becomes convertible with the sum of attributes of which some concrete individual or reality is the complement. Now, when we determine any notion by adding on a subordinate concept, we divide it; for the extension of the higher concept is precisely equal to the extension of the added concept *plus* its negation. Thus, if to the concept *animal* we add on the next lower concept *rational*, we divide its extension into two halves—the one equal to *rational animal*—the other equal to its negation, that

is, to *irrational animal.* Thus an added concept and its nega-
tion always constitute the immediately lower notion, into which
a higher notion is divided. But as a notion stands to the
notions proximately subordinate to it, in the immediate relation
of a genus to its species, the process of Determination, by
which a concept is thus divided, is, in logical language, appro-
priately denominated *Specification.*

So much in general for the Subordination of notions, con-
sidered as Genera and Species. There are, however, various
gradations of this relation, and certain terms by which these
are denoted, which it is requisite that you should learn and lay
up in memory. The most important of these are comprehended
in the following paragraph:

¶ XXXVI. A Genus is of two degrees—a highest and a
lower. In its highest degree, it is called the
Supreme or *Most General Genus (γένος*
γενικώτατον, genus summum or *generalissi-*
mum), and is defined, "that which being a genus can not
become a species." In its lower degree, it is called a *Subaltern*
or *Intermediate (γένος ὑπάλληλον, genus subalternum* or *medi-*
um), and is defined, " that which being a genus can also become
a species." A Species also is of two degrees—a lowest and a
higher. In its lowest degree, it is called a *Lowest* or *Most*
Special Species (εἶδος εἰδικώτατον, species infima, ultima,
or *specialissima*), and is defined, "that which being a species
can not become a genus." In its higher degree, it is called a
Subaltern or *Intermediate Species (εἶδος ὑπάλληλον, species*
subalterna media), and is defined, " that which being a species
may also become a genus." Thus a Subaltern Genus and a
Subaltern Species are convertible.

XXXVI. Gradations
of Genera and Species,
and their designations.

The distinctions and definitions in this paragraph are taken
from the celebrated *Introduction* of Por-
phyry to the *Categories* of Aristotle, and they

Explication.

have been generally adopted by logicians. It is evident, that
the only absolute distinction here established, is that between
the Highest or Supreme Genus and the Lowest Species; for
the other classes—to wit, the Subaltern or Intermediate—are,
all and each, either genera or species, according as we regard
them in an ascending or a descending order—the same concept
being a genus, if considered as a whole containing under it
inferior concepts as parts, and a species, if considered as itself
the part of a higher concept or whole. The distinction of
concepts into Genus and Species, into Supreme and Intermedi-
ate Genus, into Lowest and Intermediate Species, is all that
Logic takes into account; because these are all the distinctions
of degree that are given necessarily in the form of thought,
and as abstracted from all determinate matter.

It is, however, proper here to say a word in regard to the
Categories or Predicaments of Aristotle.
These are ten classes into which Existence is
divided—viz., 1. Substance; 2. Quantity; 3.
Quality; 4. Relation; 5. Action; 6. Passion; 7. Where; 8.
When; 9. Posture; and 10. Habit. (By this last is meant the
relation of a containing to a contained.) They are compre-
hended in the two following verses:

> Arbor, sex servos, fervore, refrigerat ustos,
> Ruri cras stabo, nec tunicatus ero.

In regard to the meaning of the word *category*, it is a term
borrowed from the courts of law, in which it
literally signifies an *accusation*. In a philo-
sophical application, it has two meanings, or
rather it is used in a general and in a
restricted sense. In its general sense, it means, in closer con-
formity to its original application, simply a *predication* or *attri-
bution*; in its restricted sense, it has been deflected to denote
predications or attributions of a very lofty generality, in other
words, certain classes of a very wide extension. I may here

notice, that, in modern philosophy, it has been very arbitrarily, in fact very abusively, perverted from both its primary and its secondary signification among the ancients.

But, looking at these classes as the highest genera into which simple being is divided, they are, I think, obnoxious to various objections. Without pausing to show that in other respects they are imperfect, it is manifest that the supreme genus or category *Being* is not immediately divided into these ten classes, and that they neither constitute coördinate nor distinct species. For *Being* (τὸ ὄν, *ens*) is primarily divided into *Being by itself* (*ens per se*), and *Being by accident* (*ens per accidens*). *Being by itself* corresponds to the first Category of Aristotle, equivalent to substance; *Being by accident* comprehends the other nine, but is, I think, more properly divided in the following manner: *Being by accident* is viewed either as absolute or as relative. As absolute, it flows either from the matter, or from the form of things. If from the matter, it is *Quantity*, Aristotle's second category. As relative, it corresponds to Aristotle's fourth category, *Relation*; and to Relation all the other six may be reduced. For the category *Where* is the relation of a thing to other things in space; the category *When* is the relation of a thing to other things in time. *Action* and *Passion* constitute a single relation—the relation of the agent and the patient. *Posture* is the relation of the parts of the body to each other; finally, *Habit* is the relation of a thing containing and a thing contained. The little I have now said in regard to the categories of Aristotle is more, perhaps, than I was strictly warranted to say, considering them, as I do, as wholly extralogical, and I have merely referred to them as exhibiting an example of the application of the doctrine of classification.

Categories criticized as a classification of Being.

Names for the different steps in the series of classes in the physical sciences of arrangement.

I may, likewise, notice, by the way, that in the physical sciences of arrangement, the best instances of which are seen in the different departments of Natural History,

it is found necessary, in order to mark the relative place of each step in the ascending and descending series of classes, to bestow on it a particular designation. Thus *kingdom, class, order, tribe, family, genus, subgenus, species, subspecies, variety,* and the like, are terms that serve conveniently to mark out the various degrees of generalization, in its application to the descriptive sciences of nature. With such special applications and contingent differences, Logic has, however, no concern. I therefore proceed to the last relative denomination of concepts under the head of Subordination in Extension. It is expressed in the following paragraph:

¶ XXXVII. A genus, as containing under it species, or a species as containing under it individuals, is

XXXVII. Logical and Metaphysical Wholes and Parts. called a *Logical,* or *Universal,* or *Subject* or *Subjective,* or *Potential Whole;* while species as contained under a genus, and individuals as contained under a species, are called *Logical,* or *Universal,* or *Subject,* or *Subjective,* or *Potential Parts.* *E converso*—an individual as containing in it species, or a species as containing in it genera, is called a *Metaphysical,* or *Formal,* or *Actual Whole;* while species as contained in an individual, and genera as contained in species, are called *Metaphysical,* or *Formal,* or *Actual Parts.* This nomenclature, however, in so far as metaphysical is opposed to logical, is inept; for we shall see that both those wholes and parts are equally logical, and that logicians have been at fault in considering one of them, in their doctrine of reasoning, to the exclusion of the other.

A whole is that which contains parts; a part is that which

Explication. is contained in a whole. But as the relation of a whole and parts is a relation dependent on the point of view from which the mind contemplates the objects of its knowledge, and as there are different points of view in which these may be considered, it follows that there may also be different wholes and parts. Philosophers have,

accordingly, made various enumerations of wholes; and, without perplexing you with any minute discussion of their various divisions, it may be proper, in order to make you better aware of the two wholes with which Logic is conversant (and that there are two logical wholes, and consequently, two grand forms of reasoning, and not one alone, as all logicians have hitherto taught, I shall hereafter endeavor to convince you)—to this end, I say, it may be expedient to give you a general view of the various wholes into which the human mind may group up the objects of its speculation.

General view of the various possible Wholes.

Wholes may first be divided into two genera—into a Whole by itself (*totum per se*), and a Whole by accident (*totum per accidens*). A Whole *per se* is that which the parts of their proper nature necessarily constitute; thus body and soul constitute the man. A Whole *per accidens* is that which the parts make up contingently; as when a man is considered as made up of the poor and the rich. A Whole *per se* may, again, be subdivided into five kinds, into a Logical, a Metaphysical, a Physical, a Mathematical, and a Collective. 1°. A Logical, styled also a Universal, a Subject or Subjective, a Potential Whole; and 2°. A Metaphysical, styled also a Formal or an Actual Whole—these I have defined in the paragraph. It is manifest that the logical and metaphysical wholes are the converse of each other. For as the logical whole is the genus, the logical parts the species and individual; in the metaphysical, *e contra*, an individual is the whole of which the species, a species the whole of which the genera, are the parts. A metaphysical whole is thus manifestly the whole determined by the comprehension of a concept, as a logical whole is that whole determined by its extension; and if it can be shown that the whole of comprehension affords the conditions of a process of reasoning equally valid, equally useful, equally easy, and, to say the least of it, equally natural, as that afforded by the

Whole per se, and Whole per accidens.

Whole per se divided into 1°. Logical; 2°. Metaphysical.

whole of the extension, it must be allowed that it is equally
well entitled to the name of a logical whole, as the whole which

3°. Physical.

has hitherto exclusively obtained that denomination. 3°. A Physical, or, as it is likewise
called, an Essential Whole, is that which consists of matter
and of form, in other words, of substance and of accident, as

4°. Mathematical.

its essential parts. 4°. A Mathematical,
called likewise a Quantitative, an Integral,
more properly an Integrate, Whole (*totum integratum*), is that
which is composed of integral, or, more properly, of integrant
parts (*partes integrantes*). In this whole every part lies out of
every other part, whereas, in a physical whole, the matter and
form, the substance and accident, permeate and modify each
other. Thus, in the integrate whole of a human body, the
head, body, and limbs, its integrant parts, are not contained in,

5°. Collective.

but each lies out of, each other. 5°. A
Collective, styled also a Whole of Aggregation, is that which has its material parts separate and accidentally thrown together, as an army, a heap of stones, a pile of
wheat, etc.

[There are four kinds of wholes of which Logic should take
distinct account.

The first is *the Whole of Thought*—the *Noetic Whole*. We are
under the necessity of thinking any one character which is
predicated in a judgment of a concept, or which is included in
the concept itself as belonging to it or not; in other words, of
two contradictory attributes we are obliged to think the one as
belonging, the other as not belonging, to the concept. To every
positive there is a negative; and these two parts make up a
whole in every act of thought.

The second is *the Whole of the necessary forms in which Being
enters into Thought*—the *Mathematical Whole*. It has two
species: Numerical or that of Time, and Geometrical or that
of Space.

The third is *the Whole of Substance and Attribute*—the
Substantial Whole.

The fourth is *the Whole of Cause and Effect*—the *Causal Whole.* Cause and Effect constitute a whole in our thought. They are parts complementary of each other : so that we can not think the one without thinking the other, just as we can not think a positive without thinking a negative in a Noetic Whole; or a part of a Mathematical Whole, as the half of a number or of a surface, without thinking the other half; or an attribute without thinking the substance to which it belongs.

Of these, the first, or the Noetic Whole, should be recognized in Logic, because every science of the Laws of Thought should · take account of the essential properties of Thought. The other wholes enumerated should be distinctly noted, inasmuch as they furnish the general material to which Logic is to apply its principles, and in which its laws first and necessarily realize themselves.]

¶ XXXVIII. The character, or complement of characters,
by which a lower genus or species is distin-
guished, both from the genus to which it is
subordinate, and from the other genera or
species with which it is coördinated, is called the *Generic* or the *Specific Difference,* διαφορὰ γενικἡ, and διαφορὰ εἰδικἡ, *differentia generica,* and *differentia specifica.* The sum of characters, again, by which a singular or individual thing is discriminated from the species under which it stands and from other individual things along with which it stands, is called the *Individual* or *Singular* or *Numerical Difference (differentia individualis* vel *singularis* vel *numerica).*

Two things are thus said to be generically different, inasmuch as they lie apart in two different genera; specifically different, inasmuch as they lie apart in two different species; individually or numerically different, inasmuch as they do not constitute one and the same reality. Thus, *animal* and *stone* may be said to be gener-

ically different; *horse* and *ox* to be specifically different;
Highflyer and *Eclipse* to be numerically or
individually different. It is evident, how-
ever, that as all genera and species, except
the highest of the one and the lowest of the other may be
styled indifferently either genera or species, *generic difference*
and *specific difference* are in general only various expressions
of the same thing; and, accordingly, the terms *heterogeneous*
and *homogeneous*, which apply properly only to the correlation
of genera, are usually applied equally to the correlation of
species.

Generic and Specific
Difference.

Individual existence can only be perfectly discriminated in
Perception, external or internal, and their
numerical differences are endless; for of all
possible contradictory attributes, the one or
the other must, on the principles of Contradiction and Ex-
cluded Middle, be considered as belonging to each individual
thing. On the other hand, species and genera may be per-
fectly discriminated by one or few characters. For example,
man, is distinguished from every genus or species of animal by
the one character of *rationality; triangle*, from every other
class of mathematical figures, by the single character of
trilaterality. It is, therefore, far easier adequately to describe
a genus or species than an individual existence; as in the lat-
ter case, we must select, out of the infinite multitude of char-
acters which an individual comprises, a few of the most
prominent, or those by which the thing may most easily be
recognized. But as those which we thus select are only a few,
and are only selected with reference to our faculty of appre-
hension and our capacity of memory, they always constitute
only a petty, and often not the most essential part of the
numerical differences by which the individuality of the object
is determined.

Individual or Singu-
lar Difference.

Having now terminated the consideration of the Subordina-
tion of concepts under Extension, it is only necessary to
observe that their Coördination under that quantity affords

nothing which requires explanation, except what is contained in the following paragraph:

¶ XXXIX. Notions, in so far as they are considered the coördinate species of the same genus may be called *Conspecies;* and in so far as Conspecies are considered to be different but not contradictory, they are properly called *Discrete* or *Disjunct Notions (notiones discretæ* vel *disjunctæ).* The term *Disparate (notiones disparatæ)* is frequently applied to this opposition of notions, but less properly; for this ought to be reserved to denote the corresponding opposition of notions in the quantity of Comprehension.

XXXIX. Co-ordination of Concepts.

I conclude the consideration of concepts, as dependent on Extension, by a statement of the two general laws, by which both Subordination and Coördination of notions, under this quantity, are regulated.

¶ XL. The whole classification of things by Genera and Species is governed by two laws. The one of these, the law of *Homogeneity (principium Homogeneitatis),* is—That how different soever may be any two concepts, they both still stand subordinated under some higher concept; in other words, things the most dissimilar must, in certain respects, be similar. The other, the law of *Heterogeneity (principium Heterogeneitatis),* is—That every concept contains other concepts under it; and, therefore, when divided proximately, we descend always to other concepts, but never to individuals; in other words, things the most homogeneous—similar—must, in certain respects, be heterogeneous—dissimilar.

XL. The two general laws by which Subordination and Co-ordination, under Extension, are regulated— viz., of Homogeneity and Heterogeneity.

Of these two laws, the former, as the principle which enables, and in fact compels, us to rise from species to genus, is

that which determines the process of Generification; and the
latter, as the principle which enables, and in
fact compels, us to find always species under
a genus, is that which regulates the process
of Specification.   The second of these laws, it is evident, is
only true ideally, only true in theory.   The infinite divisibility
of concepts, like the infinite divisibility of space and time,
exists only in speculation.   And that it is theoretically valid,
will be manifest, if we take two similar con-
cepts, that is, two concepts with a small dif-
ference : let us then clearly represent to our-
selves this difference, and we shall find that how small soever
it may be, we can always conceive it still less, without being
nothing, that is, we can divide it *ad infinitum ;* but as each of
these infinitesimally diverging differences affords always the
condition of new species, it is evident that we can never end,
that is, reach the individual, except *per saltum.*

Explication.
Generification and
Specification.

Law of Heterogeneity
true only in theory.

There is another law, which Kant promulgates in the *Crit-*
ique of Pure Reason, and which may be called the law of Log-
ical Affinity, or the law of Logical Contin-
uity.   It is this—That no two coördinate
species touch so closely on each other, but
that we can conceive other or others intermediate.   Thus, *man*
and *orang-outang, elephant* and *rhinoceros,* are proximate species,
but still how great is the difference between them, and how many
species can we not imagine to ourselves as possibly interjacent ?

Law of Logical Affin-
ity.

This law I have, however, thrown out of account, as not
universally true.   For it breaks down when
we apply it to mathematical classifications.
Thus all angles are either acute or right or
obtuse.   For between these three coördinate species or genera
no others can possibly be interjected, though we may always
subdivide each of these, in various manners, into a multitude
of lower species.   This law is also not true when the coördi-
nate species are   distinguished by contradictory attributes.
There can in these be no interjacent species, on the principle

Grounds on which
this law must be reject-
ed.

of Excluded Middle. For example :—in the Cuvierian classi-
fication the genus *animal* is divided into the two species of
vertebrata and *invertebrata*, that is, into animals with a back-
bone—with a spinal marrow ; and animals without a back-
bone—without a spinal marrow. Is it possible to conceive the
possibility of any intermediate class ?

Having now concluded the consideration of the Reciprocal

Reciprocal Relation
of notions in Compre-
hension.

Relation of Concepts as determined by the
quantity of Extension, I proceed to treat of
that relation as regulated by the counter quan-
tity of Comprehension. On this take the following paragraph :

¶ XLI. When two or more concepts are compared together

XLI. Identical and
different notions.

according to their Comprehension, they either
coincide or they do not ; that is, they either
do or do not comprise the same characters.
Notions are thus divided into *Identical* and *Different* (*concep-
tus identici et diversi*). The Identical are either absolutely or
relatively the same. Of notions *Absolutely Identical* there
are actually none ; notions *Relatively Identical* are called,
likewise, *Similar* or *Cognate* (*notiones similes, affines, cognatæ*) ;
and if the common attributes, by which they are allied, be
proximate and necessary, they are called *Reciprocating* or *Con-
vertible* (*notiones reciprocæ, convertibiles*).

In explanation of this paragraph, it is only necessary to say
a word in regard to notions absolutely Identical. That such
are impossible, is manifest. For, it being assumed that such

Explication.

Absolutely Identi-
cal notions impossible.

exist, as absolutely identical, they necessarily
have no differences by which they can be
distinguished : but what are indiscernible
can be known, neither as two concepts nor as two identical
concepts ; because we are, *ex hypothesi*, unable to discriminate
the one from the other. They are, therefore, to us as one.
Notions absolutely identical can only be admitted, if, abstract-
ing our view altogether from the concepts, we denominate those
notions *identical*, which have reference to one and the same

object, and which are conceived either by different minds, or by the same mind, but at different times. Their difference is, therefore, one not intrinsic and necessary, but only extrinsic and contingent. Taken in this sense, *Absolutely Identical* notions will be only a less correct expression for *Reciprocating* or *Convertible* notions.

¶ XLII. Considered under their Comprehension, concepts, again, in relation to each other, are said to be either *Congruent* or *Agreeing*, inasmuch as they may be connected in thought; or *Conflictive*, inasmuch as they can not. The confliction constitutes the *Opposition* of notions (τὸ ἀντικεῖσθαι, *oppositio*). This is twofold: 1°. *Immediate or Contradictory Opposition*, called likewise *Repugnance* (τὸ ἀντιφατικῶς ἀντικεῖσθαι, ἀντίφασις, *oppositio immediata* sive *contradictoria, repugnantia*); and, 2°. *Mediate* or *Contrary Opposition* (τὸ ἐναντίως ἀντικεῖσθαι, ἐναντιότης, *oppositio mediata* vel *con.raria*). The former emerges when one concept abolishes (*tollit*), directly or by simple negation, what another establishes (*ponit*); the latter, when one concept does this not directly or by simple negation, but through the affirmation of something else.

XLII. Opposition of Concepts.

Identity is not to be confounded with Agreement or Congruence, nor Diversity with Confliction. All identical concepts are, indeed, congruent; but all congruent notions are not identical: Thus *learning* and *virtue, beauty* and *riches, magnanimity* and *stature*, are congruent notions, inasmuch as, in thinking a thing, they can easily be combined in the notion we form of it, although in themselves very different from each other. In like manner, all conflicting notions are diverse or different notions, for unless different, they could not be mutually conflictive; but on the other hand, all different concepts are not conflictive; but those only whose difference is so great that each involves the negation of the

Explication.
Identity and Agreement, Diversity and Confliction.

other; as, for example, *virtue* and *vice, beauty* and *deformity, wealth* and *poverty.* Thus these notions are by preëminence— *κατ᾽ ἐξοχήν*—said to be *opposed,* although it is true that, in thinking, we can oppose, or place in antithesis, not only different, but even identical, concepts.

To speak now of the distinction of Contradictory and Contrary Opposition, or of Contradiction and

Contradictory and Contrary Opposition.

Contrariety; of these the former, Contradiction, is exemplified in the opposites— *yellow, not yellow; walking, not walking.* Here each notion is directly, immediately, and absolutely repugnant to the other —they are reciprocal negatives. This opposition is, therefore, properly called that of *Contradiction* or of *Repugnance;* and the opposing notions themselves are *contradictory* or *repugnant* notions, in a single word, *contradictories.* The latter, or Contrary Opposition, is exemplified in the opposites, *yellow, blue, red,* etc., *walking, standing, lying,* etc.

In the case of Contradictory Opposition, there are only two conflictive attributes conceivable; and of these one or other must be predicated of the object thought. In the case of Contrary Opposition, on the other hand, more than two conflictive characters are possible, and it is not, therefore, necessary, that if one of these be not predicated of an object, any one other must. Thus, though I can not at once sit and stand, and consequently *sitting* and *standing* are attributes each severally incompatible with the other; yet I may exist neither sitting nor standing—I may lie; but I must either sit or not sit, I must either stand or not stand, etc. Such, in general, are the oppositions of Contradiction and Contrariety.

It is now necessary to say a word in regard to their logical significance. Immediate or Contradictory

Logical Significance of Contradictory and Contrary Opposition.

Opposition constitutes, in Logic, affirmative and negative notions. By the former something is posited or affirmed (*ponitur, affirmatur*); by the latter, something is sublated or denied (*tollitur,*

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negatur). This, however, is only done potentially, in so far as concepts are viewed apart from judgments, for actual affirmation and actual negation suppose an act of judgment; but, at the same time, in so far as two concepts afford the elements, and, if brought into relation, necessitate the formation of an affirmative or negative proposition, they may be considered as in themselves negative and affirmative.

Further, it is evident that a notion can only be logically denied by a contradiction. For when we abstract from the matter of a notion, as Logic does, it is impossible to know that one concept excludes another, unless the one be supposed the negation of the other. Logically considered, all positive or affirmative notions are congruent, that is, they can, as far as their form is concerned, be all conceived or thought together; but whether in reality they can coëxist—that can not be decided by logical rules. If, therefore, we would, with logical precision and certainty, oppose things, we must oppose them not as contraries (*A B C*), but as contradictories (*A*—*not A B*—*not B C*— *not C*). Hence it also follows, that there is no negation conceivable without the concomitant conception of an affirmation; for we can not deny a thing to exist, without having a notion of the existence which is denied.

There are also certain other relations subsisting between notions compared together in reference to their Comprehension.

¶ XLIII. Notions, as compared with each other in respect of their Comprehension, are further distinguished into *Intrinsic* and *Extrinsic*. The former are made up of those attributes which are essential, and, consequently, necessary to the object of the notion : these attributes, severally considered, are called *Essentials*, or *Internal Denominations* (οὐσιώδη, *essentialia, denominationes internæ, intrinsicæ*), and, conjunctly, the *Essence* (οὐσία, *essentia*). The latter, on the contrary, consist of those attributes which belong to the object of the notion only in a contingent manner, or by possibility ; and which are, therefore,

XLIII. Intrinsic notions.

styled *Accidents*, or *Extrinsic Denominations* (συμβεβηχότα, *accidentia, denominationes externæ* or *extrinsicæ*).

So much for the mutual relations of notions in reference to their Comprehension, when considered not in the relations of Involution and Coördination.

Having thus given you the distinctions of notions, as founded on their more general relations under the quantity of Comprehension, I now proceed to consider them under this quantity in their proximate relations; that is, in the relation of Involution and the relation of Coördination. These relations have been, I may say, altogether neglected by logicians; and, in consequence of this, they have necessarily overlooked one of the two great divisions of all reasoning; for all our reasoning is either from the whole to the parts and from the parts to the whole, in the quantity of extension, or from the whole to the parts and from the parts to the whole, in the quantity of comprehension. In each quantity there is a deductive, and in each quantity there is an inductive, inference; and if the reasoning under either of these two quantities were to be omitted, it ought, perhaps, to have been the one which the logicians have exclusively cultivated. For the quantity of extension is a creation of the mind itself, and only created through, as abstracted from, the quantity of comprehension; whereas the quantity of comprehension is at once given in the very nature of things. The former quantity is thus secondary and factitious, the latter primary and natural.

Involution and Co-ordination of Concepts under Comprehension, these wholly neglected by logicians.

Hence reasoning in comprehension over-looked by logicians.

¶ XLIV. We have seen that the two quantities of notions each affords a logical Whole and Parts; and that, by opposite errors, the one of these has, through over inclusion, been called the *logical;* while the other has, through over exclusion, been called the *metaphysical.* Thus, in respect of their Compre-

XLIV. Involution and Co-ordination.

hension, no less than of their Extension, notions stand to each
other in a relation of Containing and Contained; and this
relation, which, in the one quantity (extension) is styled that
of *Subordination*, may in the other (comprehension), for dis-
tinction's sake, be styled that of *Involution*. *Coördination* is a
term which may be applied in either quantity.

In the quantity of comprehension, one notion is involved in
another, when it forms a part of the sum total of characters,
which together constitute the comprehension of that other;
and two notions are in this quantity coördinated, when, while
neither comprehends the other, both are immediately compre-
hended in the same lower concept.

From what has been formerly stated, you are aware that the

Explication.
quantity of comprehension, belonging to a
notion, is the complement of characters which
it contains in it; and that this quantity is at its maximum in
an individual. Thus the notion of the individual *Socrates*,
contains in it, besides a multitude of others, the characters of
*son of Sophroniscus, Athenian, Greek, European, man, animal,
organized being, etc.* But these notions, these characters, are
not all equally proximate and immediate; some are only given
in and through others. Thus the character *Athenian* is appli-
cable to Socrates only in and through that of *son of Sophron-
iscus*—the character of *Greek,* only in and through that of
Athenian—the character of *European,* only in and through that
of *Greek*—and so forth; in other words, Socrates is an Athe-
nian, only as the son of Sophroniscus, only a Greek as an Athe-
nian, only a European as a Greek, only a man as a European,
only an animal as a man, only an organized being as an animal.
Those characters, therefore, that are given in and through
others, stand to these others in relation of parts to wholes;
and it is only on the principle—Part of the part is a part of
the whole, that the remoter parts are the parts of the primary
whole. Thus, if we know that the individual *Socrates* compre-
hends the character *son of Sophroniscus,* and that the character

son of Sophroniscus comprehends the character *Athenian;* we are then warranted in saying that *Socrates* comprehends *Athenian,* in other words, that *Socrates* is an *Athenian.* The example here taken is too simple to show in what manner our notions are originally evolved out of the more complex into the more simple, and that the progress of science is nothing more than a progressive unfolding into distinct consciousness of the various elements comprehended in the characters, originally known to us in their vague or confused totality.

It is a famous question among philosophers, Whether our knowledge commences with the general or with the individual—whether children first employ common, or first employ proper, names. In this controversy, the reasoners have severally proved the opposite opinion to be untenable; but the question is at once solved by showing that a third opinion is the true—viz., that our knowledge commences with the confused and complex, which, as regarded in one point of view or in another, may easily be mistaken either for the individual, or for the general. The discussion of this problem belongs, however, to Psychology, not to Logic. It is sufficient to say in general, that all objects are presented to us in complexity; that we are at first more struck with the points of resemblance than with the points of contrast; that the earliest notions, and, consequently, the earliest terms, are those that correspond to this synthesis, while the notions and the terms arising from an analysis of this synthesis into its parts, are of a subsequent formation. But though it be foreign to the province of Logic to develop the history of this procedure; yet, as this procedure is natural to the human mind, Logic must contain the form by which it is regulated. It must not only enable us to reason from the simple and general to the complex and individual; it must, likewise, enable us to reverse the process, and to reason from the complex and individual to the simple and the general. And this it does by that relation of notions as containing and contained, given in the quantity of comprehension. The nature

Marginal note: Controversy regarding the *Primum Cogni-tum.*

of this reasoning can indeed only be shown, when we come to
treat of syllogism; at present, I only request
that you will bear in mind the relations of
Involution and Coördination, in which notions
stand to each other in the whole or quantity
of comprehension. In this quantity the
involving notion or whole is the more complex notion; the
involved notion or part is the more simple. Thus *pigeon* as
comprehending *bird*, *bird* as comprehending *feathered*, *feathered*
as comprehending *warm-blooded*, *warm-blooded* as compre-
hending *heart with four cavities*, *heart with four cavities* as
comprehending *breathing with lungs*, are severally to each other
as notions involving and involved. Again, notions, in the whole
of comprehension, are coördinated when they stand together as
constituting parts of the notion in which they
are both immediately comprehended. Thus
the characters *oviparous* and *warm-blooded*,
heart with four cavities, and *breathing by lungs*, as all imme-
diately contributing to make up the comprehension of the
notion *bird*, are, in this respect, severally considered as its
coördinate parts. These characters are not relative and cor-
relative—not containing and contained. For we have oviparous
animals which are not warm-blooded, and warm-blooded animals
which are not oviparous. Again, it is true, I believe, that all
warm-blooded animals have hearts with four cavities (two
auricles and two ventricles), and that all animals with such
hearts breathe by lungs and not by gills. But then, in this
case, we have no right to suppose that the first of these char-
acters comprehends the second, and that the second compre-
hends the third. For we should be equally entitled to assert,
that all animals breathing by lungs possessed hearts of four
cavities, and that all animals with such hearts are warm-blooded.
They are thus thought as mutually the conditions of each other;
and while we may not know their reciprocal dependence, they
are, however, conceived by us, as on an equal footing of
coördination. (This at least is true of the two attributes *heart*

with four cavities and *breathing by lungs;* for these must be viewed as coördinate ; but, taken together, they may be viewed as jointly necessitating the attribute of *warm-blooded,* and, therefore, may be viewed as comprehending it.)

¶ XLV. Notions coördinated in the whole of comprehension, are, in respect of the discriminating characters, different without any similarity. They are thus, *pro tanto,* absolutely different; and, accordingly, in propriety are called *Disparate Notions (notiones disparatæ).* On the other hand, notions coördinated in the quantity or whole of extension, are, in reference to the objects by them discriminated, different (or diverse) ; but, as we have seen, they have always a common attribute or attributes in which they are alike. Thus they are only relatively different (or diverse) ; and, in logical language, are properly called *Disjunct* or *Discrete Notions (notiones, disjunctæ, discretæ).*

XLV. Co-ordination of notions in Comprehension.

SECTION II.—OF THE PRODUCTS OF THOUGHT.

II.—THE DOCTRINE OF JUDGMENTS.

JUDGMENTS—THEIR NATURE AND DIVISIONS.

HAVING terminated the Doctrine of Concepts, we now pro-
ceed to the Doctrine of Judgments. Concepts and Judgments,
as I originally stated, are not to be viewed

*Doctrine of Judg-
ments.*
as the results of different operations, for
every concept, as the product of some pre-
ceding act of Comparison, is in fact a judgment fixed and
ratified in a sign. But in consequence of this acquired per-
manence, concepts afford the great means for all subsequent
comparisons and judgments ; and as this now forms their prin-
cipal relation, it behooved, for convenience, throwing out of
view their original genealogy, to consider Notions as the first
product of the Understanding, and as the conditions or elements
of the second. A concept may be viewed as an implicit or
undeveloped judgment ; a judgment as an explicit or developed
concept. But we must now descend to articulate statements.

¶ XLVI. To Judge (*κρίνειν, judicare*) is to recognize the
relation of congruence or of confliction, in

*XLVI. Judgment—
what.*
which two concepts, two individual things,
or a concept and an individual, compared
together, stand to each other. This recognition, considered as
an internal consciousness, is called a *Judgment* (*λόγος ἀποφαντι-
κός, judicium*) ; considered as expressed in language, it is called
a *Proposition* or *Predication* (*ἀπόφαντις, πρότασις, διάστημα,
propositio, prædicatio, pronunciatum, enunciatio, effatum, pro-
fatum, axioma*).

As a judgment supposes a relation, it necessarily implies a

plurality of thoughts, but conversely a plurality of thoughts does not necessarily imply a judgment. The thoughts whose succession is determined by the mere laws of Association, are, though manifested in plurality, in relation, and, consequently, in connection, not, however so related and so connected as to constitute a judgment. The thoughts *water*, *iron*, and *rusting*, may follow each other in the mental train; they may even be viewed together in a simultaneous act of consciousness, and this without our considering them in an act of Comparison, and without, therefore, conjoining or disjoining them in an act of judgment. But when two or more thoughts are given in consciousness, there is in general an endeavor on our part to discover in them, and to develop a relation of congruence or of confliction; that is, we endeavor to find out whether these thoughts will or will not coincide—may or may not be blended into one. If they coincide, we judge, we enounce, their congruence or compatibility; if they do not coincide, we judge, we enounce, their confliction or incompatibility. Thus, if we compare the thoughts—*water*, *iron*, and *rusting*—find them congruent, and connect them into a single thought, thus—*water rusts iron*—in that case we form a Judgment.

Explication — what is implied in Judgment.

But if two notions be judged congruent, in other words, be conceived as one, this their unity can only be realized in consciousness, inasmuch as one of these notions is viewed as an attribute or determination of the other. For, on the one hand, it is impossible for us to think as one two attributes, that is, two things viewed as determining, and yet neither determining or qualifying the other; nor, on the other hand, two subjects, that is, two things thought as determined, and yet neither of them determined or qualified by the other. For example, we can not think the two attributes *electrical* and *polar* as a single notion, unless we convert the one of these attributes into a subject to be determined or qualified by the

Condition under which notions are considered congruent.

other; but if we do—if we say, *what is electrical is polar*, we at once reduce the duality to unity—we judge that *polar* is one of the constituent characters of the notion *electrical*, or that what is *electrical* is contained under the class of things marked out by the common character of *polarity*. In like manner, we can not think the two subjects *iron* and *mineral* as a single notion, unless we convert the one of the subjects into an attribute by which the other is determined or qualified; but if we do—if we say, *iron is a mineral*, we again reduce the duality to unity; we judge that one of the attributes of the subject *iron* is, that it is a *mineral*, or that *iron* is contained under the class of things marked out by the common character of *mineral*.

From what has now been said, it is evident that a judgment must contain and express three notions, which, however, as mutually relative, constitute an indivisible act of thought. It must contain, 1°. The notion of something to be determined; 2°. The notion of something by which another is determined; and, 3°. A notion of the relation of determination between the two. This will prepare you to understand the following paragraph :

A judgment must contain three notions.

¶ XLVII. That which, in the act of Judging, we think as the determined or qualified notion, is technically called the *Subject* (ὑποκείμενον, *subjectum*); that which we think as the determining or qualifying notion, the *Predicate* (κατηγορούμενον, *prædicatum*); and the relation of determination, recognized as subsisting between the subject and the predicate, is called the *Copula*. By Aristotle, the predicate includes the copula; and, from a hint by him, the latter has, by subsequent Greek logicians, been styled the *Appredicate* (προσκατηγορούμενον, *apprædicatum*). The Subject and Predicate of a proposition are, after Aristotle, together called its *Terms* or *Extremes* (ὅροι ἄκρα πέρατα, *termini*); as a proposition is by

XLVII. Subject, Predicate, and Copula.

him sometimes called an *Interval* (διάστημα), being, as it were, a line stretched out between the extremes or terms. We may, therefore, articulately define a judgment or proposition to be the product of that act in which we pronounce, that, of two notions thought as subject and as predicate, the one does or does not constitute a part of the other, either in the quantity of Extension, or in the quantity of Comprehension.

Thus, in the proposition, *iron is magnetic,* we have *iron* for the Subject, *magnetic* for the Predicate, and the substantive verb *is* for the Copula. In regard to this last, it is necessary to say a few words. It is not always the case, that in propositions the copula is expressed by the substantive verb *is* or *est,* and that the copula and predicate stand as distinct words. In adjective verbs the copula and predicate coälesce, as in the proposition, *the sun shines, sol lucet,* which is equivalent to *the sun is shining, sol est lucens.* In existential propositions, that is, those in which mere exist-ence is predicated, the same holds good. For when I say *I am, Ego sum,* the *am* or *sum* has here a far higher and more emphatic import than that of the mere copula or link of con-nection. For it expresses, *I am existing, Ego sum existens.* It might seem that, in negative propositions, when the copula is affected by the negative particle, it is converted into a non-copula. But if we take the word *copula* in a wider meaning, for that through which the subject and predicate are connected in a mutual relation, it will apply not only to affirmative but to negative, not only to categorical but to hypothetical and dis-junctive, propositions.

We have thus seen that a judgment or proposition consists of three parts or correlative notions—the notion of a subject, the notion of a predicate, and the notion of the mutual relation of these as determined and determining.

Judgments may, I think, be primarily divided in two ways—the divisions being determined by the general dependencies in

Illustration.

Judgments—how di-vided.

which their component parts stand to each other—and the classes afforded by these divisions, when again considered, without distinction, in the different points of view given by Quantity, Quality, and Relation, will exhaust all the possible forms in which judgments are manifested.

¶ XLVIII. The first great distinction of Judgments is taken from the relation of Subject and Predicate, as reciprocally whole and part. If the Subject or determined notion be viewed as the containing whole, we have an Intensive or Comprehensive proposition ; if the Predicate or determining notion be viewed as the containing whole, we have an Extensive proposition.

XLVIII. First division of Judgments—Comprehensive and Extensive.

This distinction of propositions is founded on the distinction of the two quantities of concepts—their Comprehension and their Extension. The relation of subject and predicate is contained within that of whole and part, for we can always view either the determining or the determined notion as the whole which contains the other. The whole, however, which the subject constitutes, and the whole which the predicate constitutes, are different—being severally determined by the opposite quantities of comprehension and of extension ; and as subject and predicate necessarily stand to each other in the relation of these inverse quantities, it is manifestly a matter of indifference, in so far as the meaning is concerned, whether we view the subject as the whole of comprehension, which contains the predicate, or the predicate as the whole of extension, which contains the subject. In point of fact, in single propositions it is rarely apparent which of the two wholes is meant; for the copula *is, est,* etc., equally denotes the one form of the relation as the other. Thus, in the proposition *man is two-legged*—the copula here is convertible with *comprehends* or *contains in it,* for the proposition means,

Explication—this distinction founded on the Comprehension and Extension of Concepts.

man contains in it two-legged; that is, the subject *man,* as an intensive whole or complex notion, comprehends as a part the predicate *two-legged.* Again, in the proposition *man is a biped,* the copula corresponds to *contained under,* for this proposition is tantamount to *man is contained under biped;* that is, the predicate *biped,* as an extensive whole or class, contains under it as a part the subject *man.* But, in point of fact, neither of the two propositions unambiguously show whether it is to be viewed as of an intensive or of an extensive purport; nor in a single proposition is this of any moment. All that can be said is, that the one form of expression is better accommodated to express the one kind of proposition, the other better accommodated to express the other. It is only when propositions are connected into syllogisms, that it becomes evident whether the subject or the predicate be the whole in or under which the other is contained; and it is only as thus constituting two different, two contrasted, forms of reasoning—forms the most general, as under each of these every other is included—that the distinction becomes necessary in regard to concepts and propositions. The distinction of propositions into Extensive and Intensive, it is needless to say, is, therefore, likewise the most general; and, accordingly, it is only in subordination to this distinction that the other distinctions, of which we are about to treat, are valid.

I now proceed to the second division of Judgments, and commence with the following paragraph:

¶ XLIX. The second division of Judgments is founded on the different mode in which the relation of determination may subsist between the subject and predicate of a proposition. This relation is either *Simple* or *Conditional* (*propositio simplex, propositio conditionalis*). On the former alternative, the proposition is called *Categorical;* * on the latter, inasmuch

XLIX. Second division of Judgments—Categorical and Conditional—the latter of which is subdivided into Hypothetical, Disjunctive, and Dilemmatic.

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* See Appendix D.

as the condition lies either in the subject or in the predicate, or in both the subject and predicate, there are three species of propositions. In the first case, the proposition is *Hypothetical;* in the second, *Disjunctive;* in the third, *Dilemmatic* or *Hypo-thetico-disjunctive.*

In regard to the nature of a Categorical Judgment itself, it is necessary to say almost nothing. For, as this judgment is that in which the two terms stand to each other simply in that relation which every judgment implies, to the exclusion of all extrinsic conditions, it is evident, that what we have already said of the essential nature of judgments in general, affords all that can be said of categorical judgments in particular. A categorical proposition is expressed in the following formulæ— A *is* B, or, A *is not* B.

Nature of a Categorical Judgment.

I proceed, therefore, to the genus of propositions as opposed to categorical—viz., the Conditional—Conditioned. This genus, as stated in the paragraph, comprises two species, according as the condition lies more proximately in the subject or in the predicate, to which is to be added, either as a third species or as a compound of these two, those propositions in which there is a twofold condition, the one belonging to the subject, the other to the predicate. The first of these, as stated, forms the class Hypothetical, the second that of Disjunctive, the third that of Dilemmatic, propositions.*

II.—Conditional Judgments. These comprise three species.

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*I may notice, by the way, that there is a good deal of variation in the language of logicians in regard to the terms *Conditional* and *Hypothetical*. You are aware that *Conditionalis*, in Latin, is commonly applied as a translation of ὑποθετικὸς in Greek; and by Boethius, who was the first among the Latins who elaborated the logical doctrine of hypothetical, the two terms are used convertibly with each other. By many of the Schoolmen, however, the term *hypothetical* (*hypotheticus*) was used to denote the genus, and the term *conditional* to denote the species, and from them this

Hypothetical propositions are those in which the condition qualifying the relation between the subject and predicate lies proximately in the subject.

1. Hypothetical.

In the proposition, B *is* A, the subject B is unconditionally thought to exist, and it thus constitutes a categorical proposition. But if we think the subject B existing only conditionally, and under this conditional existence enunciate the judgment, we shall have the hypothetical proposition— *If* B *is*, A *is*—or, in a concrete example—*Rainy weather is wet weather*, is a categorical proposition—*If it rains, it will be wet*, is a hypothetical. In a hypothetical proposition, the objects thought stand in such a mutual relation that the one can only be thought in so far as the other is thought; in other words, if we think the one, we must necessarily think the other. They thus stand in the relation of Reason and Consequent. For a reason is that which, being affirmed, necessarily entails the affirmation of something else; a consequent is that which is only affirmed, inasmuch as something previous is affirmed. The relation between reason and consequent is necessary. For a reason followed by nothing, would not be the reason of anything, and a consequent which did not proceed from a reason, would not be the consequent of anything. A hypothetical proposition must, therefore, contain a reason and its consequent, and it thus presents the appearance of two members or clauses. The first clause—that which contains the reason—is called the *Antecedent*, also the *Reason*, the *Condition*, or the *Hypothesis* (*hypothesis, conditio, ratio, antecedens—i. e. membrum* sive *propositio*) ; the second, which contains the consequent necessitated by this ground, is called the *Consequent*, also the *Thesis* (*consequens, thesis, rationatum, conditionatum*). The relation between

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nomenclature has passed into many of the more modern compends of logic—and, among others, into those of Aldrich and Whately. This latter usage is wrong. If either term is to be used in subordination to the other, *conditional*, as the more extensive term, ought to be applied to designate the genus; and so it has accordingly been employed by the best logicians.

the two clauses is called the *Consequence* (*consequentia*), and is expressed by the particles *if* on the one hand, and *then, so, therefore*, etc., on the other, which are, therefore, called the *Consecutive particles* (*particulæ consecutivæ*). These are frequently, however, not formally expressed.

This consequence (*if is—then is*) is the copula in hypothetical propositions; for through it the concepts are brought together, so as to make up, in consciousness, but a single act of thought; consequently, in it lies that synthesis, that connection, which constitutes the hypothetical judgment. Although, therefore, a hypothetical judgment appear double, and may be cut into two different judgments, it is nevertheless not a composite judgment. For it is realized through a simple act of thought, in which *if* and *then*, the antecedent and the consequent, are thought at once and as inseparable. The proposition, *if* B *is, then* A *is*, is tantamount to the proposition, A *is through* B. But this is as simple an act as if we categorically judged B *is* A, that is, B *is under* A. Of these two, neither the one—*If the sun shines*, nor the other—*then it is day*—if thought apart from the other, will constitute a judgment, but only the two in conjunction. But if we think—*The sun shines, and it is day*, each by itself, then the whole connection between the two thoughts is abolished, and we have nothing more than two isolated categorical judgments. The relatives *if* and *then*, in which the logical synthesis lies, constitute thus an act one and indivisible.

A hypothetical judgment not composite.

Disjunctive judgments are those in which the condition qualifying the relation between the subject and predicate, lies proximately in the predicate, as in the proposition, D *is either* B *or* C, *or* A. In this class of judgments a certain plurality of attributes is predicated of the subject, but in such a manner that this plurality is not predicated conjunctly, but it is only judged that, under conditions some one, and only some one, of this bundle of attributes appertains to the subject. When I

2. Disjunctive.

say that *men are either black, or white, or tawny*—in this proposition, none of these three predicates is unconditionally affirmed; but it is only assumed that one or other may be affirmed, and that, any one being so affirmed, the others must, *eo ipso*, be denied. The attributes thus disjunctively predicable of the subject, constitute together a certain sphere or whole of extension; and as the attributes mutually exclude each other, they may be regarded as reciprocally reason and consequent. A disjunctive proposition has two forms, according as it is regulated by a contradictory, or by a contrary, opposition. A *is either* B *or not* B—*This mineral is either metal or not*—are examples of the former; A *is either* B, *or* C, *or* D—*This mineral is either lead, or tin, or zinc*—are examples of the latter. The opposite attributes or characters in a disjunctive proposition are called the *Disjunct Members* (*membra disjuncta*); and their relation to each other is called the *Disjunction* (*disjunctio*), which in English is expressed by the relative particles *either, or* (*aut, vel*), in consequence of which these words constitute the *Disjunctive particles* (*particulæ disjunctivæ*). In propositions of this class the copula is formed by *either is—or is*, for hereby the concepts are brought together so as to constitute a single object of consciousness, and thus a synthesis or union of notions is effected.

Now, although in consequence of the multiplicity of its predicates, a disjunctive proposition may be resolved into a plurality of judgments, still it is not on that account a complex or composite judgment. For it is realized by one simple energy of thought, in which the two relatives—the *either* and the *or*—are thought together, as inseparable, and as binding up the opposing predicates into a single sphere.

A Disjunctive judgment, not in reality composite.

Dilemmatic judgments are those in which a condition is found, both in the subject and in the predicate, and as thus a combination of a hypothetical form and of a disjunctive form, they may also appropriately be denominated *Hypothetico-disjunctive*.

3. Dilemmatic.

If X *is* A, *it is either* B *or* C—*If an action be prohibited, it is prohibited either by natural or by positive law*—*If a cognition be a cognition of fact, it is given either through an act of external perception or through an act of self-consciousness.* In such propositions, it is not necessary that the disjunct predicates should be limited to two; and besides what are strictly called *dilemmatic judgments*, we may have others that would properly obtain the names of *trilemmatic, tetralemmatic, polylemmatic*, etc. But in reference to propositions, as in reference to syllogisms, *dilemma* is a word used not merely to denote the cases where there are only two disjunct members, but is, likewise, extended to any plurality of opposing predicates.

There remains here, however, always an ambiguity; and perhaps, on that account, the term *hypothetico-disjunctive* might with propriety be substituted for *dilemmatic*. A proposition of this class, though bearing both a hypothetical and a disjunctive form, can not, however, be analyzed into a hypothetical and a disjunctive judgment. It constitutes as indivisible a unity of thought as either of these.

<div style="margin-left:2em; font-style:italic; font-size:smaller">A Dilemmatic judgment indivisible.</div>

[This second division of judgments is more exactly founded on the following distinctions:

1. In the nature of the subject as being either object or judgment. This distinction gives rise to the class of propositions ordinarily called *Hypothetical* from the mere accident of their ordinary form. They are essentially distinguished from other propositions by the character of the subject which in them is ever a proposition. Thus, the judgment: " If Cæsar was lawfully put to death, Brutus was a true patriot," has for its subject a proposition, not a mere notion; and the judgment might be stated thus: " The proposition that Cæsar was lawfully put to death, contains the truth that Brutus was a patriot." All hypothetical judgments can be put in this form, and must always be interpreted in this way in all correct reasoning. It is only the necessities of language, requiring that a proposition used as a subject or object must be introduced by a grammat-

ical conjunctive, as *if*, *that*, *why*, etc., which impose this form of a condition on the so-called hypothetical. It must not be supposed that this judgment is, in any respect, in its nature more hypothetical than any other judgment.

2. In the nature of the predicate, as being either a whole of thought or otherwise. This distinction gives rise to the class of judgments called *Disjunctive*. In strict logical consideration, there can be but two disjunct members, and they must be contradictory to each other.

All other judgments are Categorical or Dilemmatic.]

Every form of Judgments which we have hitherto considered, has its corresponding form of Syllogism; and it is as constituting the foundations of different kinds of reasoning, that the consideration of these different kinds of propositions is of principal importance. These various kinds of propositions may, however, be considered in the different points of view of Quantity, Quality, and Relation. And first of Quantity; in reference to which I give you the following paragraph.

Judgments considered in reference to Quantity.

¶ L. The Quantity of Judgments has reference to the whole of Extension, by the number of the objects concerning which we judge. On this I shall state articulately, 1°. The doctrine of the Logicians; and, 2°. The doctrine which I conceive to be the more correct.

L. 1°. The common doctrine of the division of Judgments according to their quantity. 2°. The doctrine of the author on this point.

1°. (The doctrine of the Logicians.) The common doctrine, which, in essentials, dates from Aristotle, divides Propositions according to their Quantities into four classes, viz.: (A) the *Universal* or *General* (*pr. universales, generales, προτάσεις αἱ καθόλου*); (B) the *Particular* (*pr. particulares προτάσεις μερικαί, αἱ ἐν μέρει*); (C) the *Individual* or *Singular* (*pr. individuales, singulares, expositoriæ, προτάσεις αἱ καθ᾽ ἕκαστον, τὰ ἄτομα*); (D) the *Indefinite* (*pr. impræfinitæ, indefinitæ, προτάσεις ἀδιόριστοι, ἀπροσδιό-*

ρισται). They mean by *universal propositions*, those in which
the subject is taken in its whole extension; by *particular
propositions*, those in which the subject is taken in a part,
indefinitely, of its extension; by *individual propositions*, those
in which the subject is at a minimum of extension; by *indefi-
nite propositions*, those in which the subject is not articulately
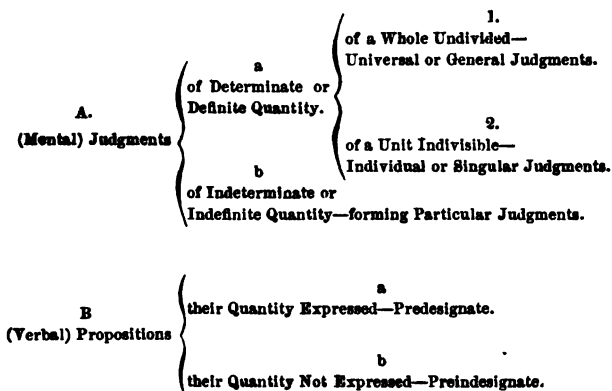or overtly declared to be either universal, particular, or indi-
vidual.

2°. (The doctrine I prefer.)   This doctrine appears to me
untenable, and I divide Propositions according to their Quan-
tity in the following manner :   In this respect their differences
arise either (A), as in Judgments, from the necessary condition
of the Internal Thought; or (B), as in Propositions, merely
from the accidental circumstances of its External Expression.

Under the former head (A), Judgments are either (a) of
Determinate or Definite Quantity, according as their sphere is
circumscribed, or (b) of Quantity Indeterminate or Indefinite,
according as their sphere is uncircumscribed.   Again, Judgments
of a Determinate Quantity (a) are either (1) of a Whole
Undivided, in which case they constitute a *Universal* or *General
Proposition;* or (2) of a Unit Indivisible, in which case, they
constitute an *Individual* or *Singular Proposition*.   A Judg-
ment of an Indeterminate Quantity (b) constitutes a *Particular
Proposition*.

Under the latter head (B), Propositions have either, as prop-
ositions, their quantity, determinate or indeterminate, marked
out by a verbal sign, or they have not; such quantity being
involved in every actual thought.   They may be called in the
one case (a) *Predesignate;* in the other (b) *Preindesignate*.

Again, the common doctrine, remounting also to Aristotle,
takes into view only the Subject, and regulates the quantity of
the proposition exclusively by the quantity of that term.   The
Predicate, indeed, Aristotle and the logicians do not allow to
be affected by quantity; at least they hold it to be always
Particular in an Affirmative, and Universal in a Negative
Proposition.

This doctrine I hold to be the result of an incompetent analysis; and I hope to show you that the confusion and multiplicity of which our present Logic is the complement, is mainly the consequence of an attempt at synthesis, before the ultimate elements had been fairly reached by a searching analysis, and of a neglect, in this instance, of the fundamental postulate of the science.

A.
(Mental) Judgments

   a
  of Determinate or Definite Quantity.

         1.
   of a Whole Undivided—
   Universal or General Judgments.

         2.
   of a Unit Indivisible—
   Individual or Singular Judgments.

   b
  of Indeterminate or
  Indefinite Quantity—forming Particular Judgments.

B
(Verbal) Propositions

     a
  their Quantity Expressed—Predesignate.

     b
  their Quantity Not Expressed—Preindesignate.

Universal Judgments are those in which the whole number of objects within a sphere or class are judged of—as *All men are mortal,* or *Every man is mortal,* the *all* in the one case defining the whole collectively—the *every* in the other defining it discretively. In such judgments the notion of a determinate wholeness or totality, in the form of omnitude or allness, is involved.

Explication. Universal Judgments.

Individual Judgments are those in which, in like manner, the whole of a certain sphere is judged of, but in which sphere there is found only a single object, or collection of single objects—as *Catline is ambitious—The twelve apostles were inspired.* In such judgments the notion of determinate wholeness or totality in the form of oneness, indivisible unity, is involved.

Singular or Individual Judgments—what.

Particular Judgments are those in which, among the objects within a certain sphere or class, we judge concerning some indefinite number less than the whole, as *Some men are virtuous—Many boys are courageous—Most women are compassionate.* The indefinite plurality, within the totality, being here denoted by the words *some, many, most.* There are certain words which serve to mark out the quantity in the case of Universal, Individual, and Particular propositions. The words which designate universality are *all, the whole of, every, both, each, none, no one, neither, always, everywhere,* etc. The words which mark out particularity are *some, not all, one, two, three,* etc., *sometimes, somewhere,* etc. There are also terms which, though they do not reach to a universal whole, approximate to it, as *many, most, almost all, the greatest part,* etc., *few, very few, hardly any,* etc., which, in the common employment of language, and in reference to merely probable matter, may be viewed as almost tantamount to marks of universality.

Particular Judgments—what.

Words which serve to mark out quantity in Universal, Individual, and Particular Propositions.

By logicians in general it is stated, that, in a logical relation, an Individual is convertible with a Universal proposition ; as in both something is predicated of a whole subject, and neither admits of any exception. But a Particular Judgment, likewise, predicates something of a whole subject, and admits of no exception ; for it embraces all that is viewed as the subject, and excludes all that is viewed as not belonging to it. The whole distinction consists in this—that, in Universal and in Individual Judgments, the number of the objects judged of is thought by us as definite ; whereas, in Particular Judgments, the number of such objects is thought by us as indefinite. That Individual Judgments do not correspond to Universal Judgments, merely in virtue of the oneness of their subject, is shown by this ; that, if the individual be rendered indefinite, the judgment at once assumes the character of par-

Distinction of Universal and Individual from Particular Judgments.

ticularity. For example, the propositions—*A German invented
the art of printing*—*An Englishman generalized the law of
gravitation*—are to be viewed as particular propositions. But, if
we substitute for the indefinite expressions *a German* and *an
Englishman*, the definite expressions *Faust* and *Newton*, the
judgment obtains the form of a universal.

I now go on to the next division of Judgments, the division
proceeding on that ground which by Logi-
cians has been called the *Quality* of Judg-
ments. In itself the term *quality* is here a
very vague and arbitrary expression, for we
might, with equal propriety, give the name
of *quality* to several other of the distinguishing principles of
propositions. For example the truth or falsehood of proposi-
tions has been also called their *quality ;* and some logicians
have even given the name of *quality* to the ground of the dis-
tinction of judgments into categorical, hypothetical, and dis-
junctive. What, however, has been universally, if not always
exclusively, styled the *quality* of propositions, both in ancient
and modern times, is that according to which they are distrib-
uted into Affirmative and Negative.

*Second division of
Judgments, or that ac-
cording to their Qual-
ity.*

¶ LI. In respect of their Quality, Judgments are divided
into two classes. For either the Subject and
Predicate may be recognized as reciprocally
containing and contained, in the opposite
quantities of Extension and Comprehension;
or they may be recognized as not standing in
this relation. In the former case, the subject and predicate
are affirmed of each other, and the proposition is called an
Affirmative (πρότασις καταφατική or κατηγορική, *judicium
affirmativum* or *positivum*) ; in the latter case, they are denied
of each other, and the proposition is called a *Negative* (πρό-
τασις ἀποφατική or στερητική, *judicium negativum*).

*LI. Judgments, in
respect of their Quality,
are Affirmative and
Negative.*

In this paragraph, I have enounced more generally than is

done by logicians the relation of predication, in its affirmative and negative phases. For their definitions only apply either to the subject or to the predicate, taken as a whole; whereas, since we may indifferently view either the subject as the whole in relation to the predicate, or the predicate as the whole in relation to the subject, according as we consider the proposition to express an intensive or to express an extensive judgment—it is proper in our definition, whether of predication in general, or of affirmation and negation in particular, to couch it in such terms that it may indifferently comprehend both these classes—both these phases, of propositions.

Explication. Generality of the definition of predication in the paragraph.

As examples of Affirmative and Negative propositions, the following may suffice ; A *is* B—A *is not* B ; *God is merciful ; God is not vindictive.* In an Affirmative judgment, there is a complete inclusion of the subject within the predicate as an extensive whole ; or of the predicate within the subject as an intensive whole. In Negative judgments, on the contrary, there is a total exclusion of the subject from the sphere of the predicate (extensively), or of the predicate from the comprehension of the subject (intensively). In affirmative propositions there is also distinctly enounced through what predicate the notion of the subject is to be thought, that is, what predicate must be annexed to the notion of the subject ; in negative propositions, in like manner, it is distinctly enounced through what predicate the notion of the subject is not to be thought, that is, what predicate must be shut out from the notion of the subject. In negative judgments, therefore, the negation essentially belongs to the Copula ; for otherwise all propositions without distinction would be affirmative. This, however, has been a point of controversy among modern logicians ; for many maintain that the negation belongs to the predicate on the following grounds : If the negation pertained to the copula, there could be. no synthesis of the two terms ; the whole act of

Affirmative and Negative Propositions.

That Negation does not belong to the Copula, held by some logicians.

judgment would be subverted, while at the same time a non-connecting copula, a non-copulative, is a contradiction in terms. But a negative predicate, that is, a predicate by which something is taken away or excluded from the subject, involves nothing contradictory; and, therefore, a judgment with such a predicate is competent.

The opposite doctrine is, however, undoubtedly the more correct. For if we place the negation in the predicate, negative judgments, as already said, are not different in form from affirmative, being merely affirmations that the object is contained within the sphere of a negative predicate, or that a negative predicate forms one of the attributes of the subject. This, however, the advocates of the opinion in question do not venture to assert. The objection from the apparent contradiction of a non-connecting copula is valid only if the literal, the grammatical, meaning of the term *copula* be coëxtensive with that which it is applied logically to express. But this is not the case. If literally taken, it indicates only one side of its logical meaning. What the word *copula* very inadequately denotes, is the form of the relation between the subject and predicate of a judgment. Now, in negative judgments, this form essentially consists in the act of taking a part out of a whole, and is as necessary an act of thought as the putting it in. The notion of the one contradictory in fact involves the notion of the other.

The opposite doctrine maintained by the Author.

True import of the logical copula.

The controversy took its origin in this—that every negative judgment can be expressed in an affirmative form, when the negation is taken from the copula and placed in the predicate. Thus, A *is not* B may be changed into—A *is not*-B. The contrast is better expressed in Latin, A *non est* B; A *est non*-B. In fact, we are compelled in English to borrow the Latin *non* to make the difference unambiguously apparent, saying, A *is non*-B, instead of A *is not*-B. But this proves

Origin of the controversy regarding the place of negation.

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nothing; for by this transposition of the negation from the copula to the predicate, we are also enabled to express every affirmative proposition through a double negation. Thus, A *is* B, in the affirmative form is equivalently enounced by A *is not non*-B; A *non est non*-B, in the negative.

If we consider the quantity and quality of judgments as combined, there emerges from this juncture four separate forms of propositions, for they are either Universal Affirmative, or Universal Negative, Particular Affirmative, or Particular Negative. These forms, in order to facilitate the statement and analysis of the syllogism, have been designated by letters; and as it is necessary that you should be familiar with these symbols, I shall state them in the following paragraph:

¶ LII. In reference to their Quantity and Quality together, Propositions are designated by the vowels A, E, I, O. The *Universal Affirmative* are denoted by A; the *Universal Negative* by E; the *Particular Affirmative* by I; the *Particular Negative* by O. To aid the memory, these distinctions have been comprehended in the following lines:

LII. Division of Propositions according to their Quantity and Quality taken together.

> Asserit A, negat E, sed universaliter ambæ;
> Asserit I, negat O, sed particulariter ambo.

Before leaving this part of the subject, I may take notice of another division of Propositions, made by all logicians, viz., into *Pure* and *Modal*. Pure propositions are those in which the predicate is categorically affirmed or denied of the subject, simply without any qualification; Modal, those in which the predicate is categorically affirmed or denied of the subject, under some mode or qualifying determination.

A proposition is called *Assertory*, when it enounces what is known as actual; *Problematic*, when it enounces what is known as possible; *Apodictic* or *Demonstrative*, when it enounces what is known as necessary.

Explanations of three terms used in reference to Pure and Modal Propositions.

The last point of view in which judgments are considered, is their Relation to each other. In respect of these relations, propositions have obtained from logicians particular names, which, however, can not be understood without at the same time regarding the matter which the judgments contain. As the distinctions of Judgments and of Concepts are, in this respect, in a great measure analogous, both in name and nature, it will not be necessary to dictate them:

Third Division of Judgments — Relation to each other.

When the matter and form of two judgments are considered as the same, they are called *Identical, Convertible, Equal,* or *Equivalent* (*propositiones identicæ, pares, convertibiles, æquipollentes*); on the opposite alternative, they are called *Different* (*pr. diversæ*). If considered in certain respects the same, in others different, they are called *Relatively Identical, Similar,* or *Cognate* (*pr. relative identicæ, similes, affines, cognatæ*). This resemblance may be either in the subject and comprehension, or in the predicate and extension. If they have a similar subject, their predicates are *Disparate* (*disparata*); if a similar predicate, their subjects are *Disjunct* (*disjuncta*).

Judgments Identical.

Different.

Relatively Identical.

Disparate.

Disjunct.

When two judgments differ merely in their quantity of extension, and the one is, therefore, a particular, the other a general, they are said to be subordinated, and their relation is called *Subordination* (*subordinatio*). The subordinating (or as it might, perhaps, be more properly styled, the *superordinate*) judgment, is called the *Subalternant* (*subalternans*); the subordinate judgment is called the *Subalternate* (*subalternatum*).

Subalternant.

Subalternate.

When, of two or more judgments, the one affirms, the other denies, and when they are thus reciprocally different in quality, they are said to be *Opposed* or *Conflictive* (*pr. oppositæ, ἀντι-*

Opposition of Judgments.

κείμεναι), and their relation, in this respect, is called *Opposition*

Contradiction.
Contrariety. (*oppositio*). This opposition is either that of *Contradiction* or *Repugnance* (*contradictio, ἀντίφασις*), or that of *Contrariety* (*contrarietas, ἐναντιότης*).

If neither contradiction nor contrariety exists, the judgments

Congruent Judg-
ments. are called *Congruent* (*pr. congruentes, consonantes, consentientes*). In regard to this last statement, you will find in logical books, in

Subcontrary opposi-
tion. general, that there is an opposition of what are called *Subcontraries* (*subcontraria*), meaning by these particular propositions of different quality, as, for example, *some A are B, some A are not B* ; or, *some men are learned, some men are not learned;* and they are called *Subcontraries,* as they stand subordinated to the universal contrary propositions—All A *are* B, *no* A *is* B ; or, *All men are learned, no man is learned.* But this is a mistake,

Not a real opposi-
tion. there is no opposition between Subcontraries ; for both may at once be maintained, as both at once must be true if the *some* be a negation of *all.* They can not, however, both be false. The opposition in this case is only apparent ; and it was probably only laid down from a love of symmetry, in order to make out the opposition of all the corners in the square of Opposition, which you will find in almost every work on Logic.

Finally, various relations of judgments arise from what is

Conversion of Propo-
sitions. called their *Conversion.* When the subject and predicate in a categorical proposition (for to this we now limit our consideration) are transposed, the proposition is said to be converted ; the proposition given and its product are both called the *judicia conversa* (converted judgments) *;* the relation itself of reciprocation in which the judgments stand is called

Terms employed to
denote the original and
converted proposition. *Conversion,* sometimes *Obversion* and *Transposition* (*reciprocatio, conversio, obversio, transpositio, μετάθεσις, μεταβολή, ἀντιστροφή*).

The given proposition is called the *Converted* or *Converse*
(*judicium, propositio, prœjacens, conversum, conversa*); the
other into which it is converted, the *Converting* (*jud., prop.,
convertens*).*

It may be proper now to make you acquainted with certain
distinctions of judgments and propositions,
which, though not strictly of a logical char-
acter, it is of importance that you should be
aware of. Considered in a material point of
view, all judgments are, in the first place, distinguished into
Theoretical and *Practical.* Theoretical are
such as declare that a certain character
belongs or does not belong to a certain
object; *Practical,* such as declare that something can be or
ought to be done—brought to bear.

*Distinction of Propo-
sitions not strictly log-
ical.*

*Theoretical and Prac-
tical.*

Theoretical, as well as practical judgments, are either *Inde-
monstrable,* when they are evident of them-
selves; when they do not require, and when
they are incapable of proof: or they are
Demonstrable, when they are not immediately apparent as true
or false, but require some external reason to establish their
truth or falsehood.

*Indemonstrable and
Demonstrable.*

Indemonstrable propositions are absolute principles (ἀρχαί,
principia); that is, from which in the construction of a system
of science, cognitions altogether certain not only are, but must
be, derived. Demonstrable propositions, on the other hand,
can, at best, constitute only relative principles; that is, such
as, themselves requiring a higher principle for their warrant,
may yet afford the basis of sundry other propositions.

If the indemonstrable propositions be of a theoretical char-
acter, they are called *Axioms;* if of a prac-
tical character, *Postulates.* The former are
principles of immediate certainty; the latter,
principles of immediate application.

*Axioms and Postu-
lates.*

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* See Appendix E.

Demonstrable propositions, if of a theoretical nature, are called *Theorems (theoremata)* ; if of a practical, *Problems (problemata)*. The former, as propositions of a mediate certainty, require proof; they, therefore, consist of a *Thesis* and its *Demonstration* ; the latter, as of mediate application, suppose a *Question (quæstio)* and its *Solution (resolutio)*.

Theorems and Problems.

As species of the foregoing, there are, likewise, distinguished *Corollaries (consectaria, corollaria)*, that is, propositions which flow, without a new proof, out of theorems or postulates previously demonstrated. Propositions whose validity rests on observation or experiment arc called *Experiential, Experimental propositions (empiremata, experientiæ, experimenta)*. *Hypotheses*, that is, propositions which are assumed with probability, in order to explain or prove something else which can not otherwise be explained or proved. *Lemmata*, that is, propositions borrowed from another science, in order to serve as subsidiary propositions in the science of which we treat. Finally, *Scholia*, that is, propositions which only serve as illustrations of what is considered in chief. The clearest and most appropriate examples of these various kinds of propositions are given in mathematics.

Corollaries.

Experimental propositions.

Hypotheses.

Lemmata.

Scholia.

SECTION II.—OF THE PRODUCTS OF THOUGHT.

III.—THE DOCTRINE OF REASONINGS.

I.—REASONING IN GENERAL. SYLLOGISMS—THEIR DIVISIONS ACCORDING TO INTERNAL FORM.

[THE term *Reasoning* is used sometimes in a broader, sometimes in a narrower, sense. In its broader import, it includes *any derived judgment*. It implies at least two judgments, one of which is viewed as not a product of original comparison, but as derived from such comparison. Now, a derived judgment may depend on a single judgment, or a plurality of judgments. In the narrower import, the term *Reasoning* denotes a judgment depending on a plurality of judgments. For the purposes of distinctness, those Reasonings or Derived Judgments which depend on a single judgment, are called *Immediate Reasonings;* and those which depend on a plurality of judgments are called *Mediate Reasonings,* or simply *Reasonings.*

An Immediate Reasoning is one which depends on the relation of the two notions compared in a judgment, and as derived at once from it without the mediation of a third notion.

Immediate Reasonings may be distinguished into four classes, according as the dependence rests:

1. On the relation itself between the subject and the predicate of the original judgment, as one of identity; or,

2. On the nature of the notions themselves, as wholes containing parts; or,

3. On the nature of thought itself under its law of non-contradiction; or,

4. On the relations of modality.

The first class includes the various forms of *Simple Conver-*

sion. It is plain that from the identity which is affirmed between the subject and the predicate of a judgment, we may transpose the terms at will, and affirm if "A is B," that "B is A." Inasmuch, however, as in discourse we often do not *distribute* the predicate, that is, do not use the predicate in all its extent, we can convert only in universal negative and particular affirmative propositions without the use of awkward limitations. But in these two classes of propositions, we can reason immediately from the original to the converse. As from the proposition, "No man is immortal," we can derive immediately the converse, "No immortal is man or human." In the same way, from the proposition, "Some men are learned," we can immediately infer that "Some learned (beings) are men."

The second class of Immediate Reasonings embraces those of *Explication*, in which we infer immediately from a predicate being affirmed as a whole, that the part of the predicate may be affirmed of the subject, or the whole predicate may be affirmed of a part of the subject. Thus, from the proposition, "Man is a rational animal," we may infer at once either that "Man is rational," or that "Some men are rational animals."

There are two varieties of the Explicative class of Immediate Reasonings, distinguished by the nature of the subject as being a mere concept or a proposition. Where the subject is a proposition, we have the form "That the sun has risen, contains the proposition that it is light;" or what is exactly equivalent, "If the sun has risen, it is light." Here I can infer at once from the subject, which is a truth, the derived truth that "it is light." The more common form of this kind of reasoning is in the use of the conjunctive *if* instead of *that;* as, "If the sun has risen, it is light." But the form is accidental and immaterial. The Hypothetical Reasoning, so called, will be recognized in the subsequent exposition of its nature and its laws, as constituting this variety of the Explicative class of Immediate Reasonings.

The third class of Immediate Reasonings includes those which rest on a logical disjunction; as when from the proposition " A is B," we infer at once that "A is not non-B." These reasonings are called *Disjunctive Reasonings*. They are clearly Immediate Reasonings in their nature, not requiring the mediation of any third term. But inasmuch as the proposition affirming the truth of the assumed premise which, in the categorical syllogism, is omitted in expression, but always necessarily implied, is, in this class—as in Hypothetical Reasonings—ordinarily expressed in form, they, like Hypothetical Reasonings, have been treated by logicians generally in connection with Mediate Reasonings.

The fourth class of Immediate Reasonings are founded on the necessary relations of modality; as from the Apodictic or the Necessary we may immediately infer the Problematic or Possible, and also the Assertory or Actual; and, moreover, from the Assertory may thus infer the Possible. Thus, from the necessary truth, " Every triangle must contain angles that are together equal to two right-angles," we infer immediately the actual truth that " Every triangle *does* contain, etc," and the possible, that " Every triangle *may*, etc;" or from the assumed necessary truth that it is the order of nature, " The sun *must* rise to-morrow," we infer at once the actual truth that the " Sun *will* rise to-morrow," and the possible that " It *can* rise to-morrow."]

When the necessity of the junction or separation of a certain subject-notion and a certain predicate-notion

The act of reasoning —what.

is not manifest from the nature of these notions themselves; but when, at the same time, we are desirous of knowing whether they must be thought as inclusive, or as exclusive of each other; in this case, we find ourselves in a state of doubt or indecision, from our ignorance of which of the two contradictory predicates must be affirmed or denied of the subject. But this doubt can be dissipated— this ignorance can be removed, only in one way—only by producing in us a necessity to connect with, or disconnect from,

the subject one of the repugnant predicates. And since, *ex hypothesi*, this necessity does not—at least, does not immediately—arise from the simple knowledge of the subject in itself, or of the predicate in itself, or of both together in themselves, it follows that it must be derived from some external source ; and derived it can only be, if derived, from some other knowledge, which affords us, as its necessary consequence, the removal of the doubt originally harbored. But if this knowledge has for its necessary consequence the removal of the original doubt, this knowledge must stand to the existing doubt in the relation of a general rule ; and, as every rule is a judgment, it will constitute a general proposition. But a general rule does not simply and of itself reach to the removal of doubt and indecision ; there is required, and necessarily required, over and above this further knowledge, that the rule has really an application, or, what is the same thing, that the doubt really stands under the general proposition, as a case which can be decided by it as by a general rule. But when the general rule has been discovered, and when its application to the doubt has likewise been recognized, the solution of the doubt immediately follows, and therewith the determination of which of the contradictory predicates must or must not be affirmed of the subject ; and this determination is accompanied with a consciousness of necessity or absolute certainty. A simple example will place the matter in a clearer light. When the notion of the subject *man* is given along *Illustrated by an example.* with the contradictory predicates *free agent* and *necessary agent*, there arises the doubt, with which of these contradictory predicates the subject is to be connected ; for, as contradictory, they can not both be affirmed of the subject, and, as contradictory, the one or the other must be so affirmed ; in other words, I doubt whether *man* be a *free agent* or *not*. The notion *man*, and the repugnant notions *free agent* and *necessary agent*, do not, in themselves, afford a solution of the doubt ; and I must endeavor to discover some other notion which will enable me to decide. Now, taking the predicate

free agent, this leads me to the closely connected notion *morally responsible agent*, which let it be supposed that I otherwise know to be necessarily a free agent; I thus obtain the proposition, *Every morally responsible agent is a free agent.* But this proposition does not of itself contain the solution of the doubt; for it may still be asked, Does the notion *morally responsible agent* constitute a predicate which appertains to the notion of *man*, the subject? This question is satisfied, if it is recognized that the notion *man* involves in it the notion of a *morally responsible agent.* I can then say, *Man is a morally responsible agent.* These two propositions being thus formed and applied to the subsisting doubt, the removal of this doubt follows of itself, and, in place of the previous indecision, whether man be a free agent or not, there follows, with the consciousness of necessity or absolute certainty, the connected judgment that *Man is also a free agent.* The whole process, the whole series of judgments, will stand thus:

> *Every morally responsible agent is a free agent;*
> *Man is a morally responsible agent;*
> *Therefore, man is a free agent.*

Let us consider in what relation the different constituent parts of this process stand to each other. It is evident that the whole process consists of three notions and their mutual relations. The three notions are, *free agent, responsible agent,* and *man.* Their mutual relations are all those of whole and part, and whole and part in the quantity of extension; for the notion *free agent* is seen to contain under it the notion *responsible agent,* and the notion *responsible agent* to contain under it the notion *man.* Thus, these three notions are like three circles of three various extensions severally, contained one within another; and it is evident that the process by which we recognize that the narrowest notion,

man, is contained under the widest notion, *free agent,* is precisely the same by which we should recognize the inmost circle to be contained in the outmost, if we were only supposed to know the relation of these together by their relation to the middle circle. Let A, B, C, denote the three circles. Now, *ex hypothesi,* we know, and only know, that A contains B, and that B contains C; but as it is a self-evident principle, that a part of the part is a part of the whole, we can not, with our knowledge that B contains C, and is contained in A, avoid recognizing that C is contained in A. This is precisely the case with the three notions—*free agent, responsible agent, man;* not knowing the relation between the notions *free agent* and *man,* but knowing that *free agent* contained under it *responsible agent,* and that *responsible agent* contained under it *man,* we, upon the principle that the part of a part is a part of the whole, are compelled to think, as a necessary consequence, that *free agent* contains under it *man.* It is thus evident, that the process shown in the example adduced is a mere recognition of the relation of three notions in the quantity of extension—our knowledge of the relation of two of these notions to each other being not given immediately, but obtained through our knowledge of their relation to the third.

But let us consider this process a little closer. The relations of the three notions, in the above example, are those given in the quantity of Breadth or Extension. But every notion has not only an Extensive, but likewise an Intensive, quantity—not only a quantity in breadth, but a quantity in depth ; and these two quantities stand to each other, as we have seen, always in a determinate ratio—the ratio of inversion. It would, therefore, appear, *a priori,* to be a necessary presumption, that if notions bear a certain relation to each other in the one quantity, they must bear a counter-relation to each other in the other quantity ; consequently, that if we are able, under the quantity of extension, to deduce from the rela-

tions of two notions to a third their relation to each other, a correspondent evolution must be competent of the same notions, in the quantity of comprehension. Let us try whether this theoretical presumption be warranted *a posteriori*, and by experiment, and whether, in the example given, the process can be inverted, and the same result obtained with the same necessity. That example, as in extension, was:

> *All responsible agents are free agents ;*
> *But man is a responsible agent;*
> *Therefore, man is a free agent.*

In other words, the notion *responsible agent* is contained under the notion *free agent;* but the notion *man* is contained under the notion *responsible agent;* therefore, on the principle that the part of a part is a part of the whole, the notion *man* is also contained under the notion *free agent*. Now, on the general doctrine of the relation of the two quantities, we must, if we would obtain the same result in the comprehensive which is here obtained under the extensive quantity, invert the whole process, that is, the notions which in extension are wholes become in comprehension parts, and the notions which in the former are parts, become in the latter wholes. Thus the notion *free agent*, which, in the example given, was the greatest whole, becomes, in the counter process, the smallest part, and the notion *man*, which was the smallest part, now becomes the greatest whole. The notion *responsible agent* remains the middle quantity or notion in both, but its relation to the two other notions is reversed; what was formerly its part being now its whole, what was formerly its whole being now its part. The process will, therefore, be thus explicitly enounced :

> *The notion man comprehends in it the notion responsible agent;*
> *But the notion responsible agent comprehends in it the notion free agent;*
> *Therefore, on the principle that the part of a part is a part of the whole, the notion man also comprehends in it the notion free agent.*

Or, in common language:

> *Man is a responsible agent ;*
> ' *But a responsible agent is a free agent ;*
> *Therefore, man is a free agent.*

This reversed process, in the quantity of comprehension, gives, it is evident, the same result as it gave in the quantity of extension. For, on the supposition, that we did not immediately know that the notion *man* comprehended *free agent*, but recognized that *man* comprehended *responsible agent*, and that *responsible* agent comprehended *free agent*, we necessarily are compelled to think, in the event of this recognition, that the notion *man* comprehends the notion *free agent*.

It is only necessary further to observe, that in the one process—that, to wit, in extension, the copula *is*, means *is contained under*, whereas, in the other, it means *comprehends in*. Thus the proposition, *God is merciful*, viewed as in the one quantity, signifies *God is contained under merciful;* that is, the notion *God* is contained under the notion *merciful;* viewed as in the other, means—*God comprehends merciful*, that is, the notion *God comprehends in it* the notion *merciful*.

The copula in extension and comprehension of a counter-meaning.

Now, this process of thought (of which I have endeavored to give you a general notion) is called *Reasoning ;* but it has, likewise, obtained a variety of other designations. The definition of this process, with its principal denominations, I shall include in the following paragraph :

¶ LIII. Reasoning is an act of mediate comparison or Judgment; for to reason is to recognize that two notions stand to each other in the relation of a whole and its parts, through a recognition, that these notions severally stand in the same relation to a third. Considered as an act, Reasoning, or Discourse of Reason (τὸ

LIII. Definition of the process of Reasoning, with the principal denominations of process and product.

λογίζεσθαι, λογισμός, διάνοια, τὸ διανοεῖσθαι), is, likewise, called the act or process of *Argumentation* (*argumentationis*), of *Ratiocination* (*ratiocinationis*), of *Inference* or *Illation* (*inferendi*), of *Collecting* (*colligendi*), of *Concluding* (*concludendi*), of *Syllogising* (τοῦ συλλογίζεσθαι, barbarously *syllogisandi*). The term *Reasoning* is, likewise, given to the product of the act; and a reasoning in this sense (*ratiocinatio, ratiocinium*), is, likewise, called an *Argumentation* (*argumentatio*) ; also, frequently, an *Argument* (*argumentum*), an *Inference* or *Illation* (*illatio*) ; a *Collection* (*collectio*), a *Conclusion* (*conclusio*, συμπέρασμα) ; and, finally, a *Syllogism* (συλλογισμὸς).

A few words in explanation of these will suffice; and, first,

Explication. of the thing and its definition, thereafter of its names.

In regard to the act of Reasoning, nothing can be more

1. The act of Reasoning. erroneous than the ordinary distinction of this process, as the operation of a faculty different in kind from those of Judgment and Conception. Conception, Judgment, and Reasoning, are, in reality, only various applications of the same simple faculty, that of Comparison or Judgment. I have endeavored to show that concepts are merely the results, rendered permanent by language, of a previous process of comparison; that judgment is nothing but comparison, or the results of comparison, in its immediate or simpler form; and, finally, that reasoning is nothing but comparison in its mediate or more complex application. It is, therefore, altogether erroneous to maintain, as is commonly done, that a reasoning or syl-

A reasoning is one organic whole. logism is a mere decompound whole, made up of judgments; as a judgment is a compound whole, made up of concepts. This is a mere mechanical mode of cleaving the mental phenomena into parts; and holds the same relation to a genuine analysis of mind which the act of the butcher does to that of the anatomist. It is true, indeed, that a syllogism can be separated into three parts or proposi-

tions; and that these propositions have a certain meaning, when considered apart, and out of relation to each other. But, when thus considered, they lose the whole significance which they had when united in a reasoning; for their whole significance consisted in their reciprocal relation—in the light which they mutually reflected on each other. We can certainly hew down an animal body into parts, and consider its members apart; but these, though not absolutely void of all meaning, when viewed singly and out of relation to their whole, have lost the principal and peculiar significance which they possessed as the coefficients of a one organic and indivisible whole. It is the same with a syllogism. The parts which, in their organic union, possessed life and importance, when separated from each other, remain only enunciations of vague generalities, or of futile identities. Though, when expressed in language, it be necessary to analyze a reasoning into parts, and to state these parts one after another, it is not to be supposed that in thought one notion, one proposition, is known before or after another; for, in consciousness, the three notions and their reciprocal relations constitute only one identical and simultaneous cognition.

The logicians have, indeed, all treated the syllogism as if this were not the case. They have considered one proposition as naturally the last in expression, and this they have accordingly called the *conclusion;* while the other two, as naturally going before the other two, they have styled the *premises,* forming together what they call the *antecedent.* The two premises they have also considered as the one the greater (*major*), the other the less (*minor*), by exclusive reference to the one quantity of extension. All this, however, is, in my view, completely erroneous. For we may, in the theory of Logic, as we actually do in its practical applications, indifferently enounce what is called the *conclusion* first or last. In the latter case, the conclusion forms a thesis, and the premises its grounds or reasons; and instead of the inferential *therefore*

Error of logicians in their treatment of the Syllogism.

(*ergo, ἄρα*), we would employ the explicative *for*. The whole difference consists in this—that the common order is synthetic, the other analytic; and as, to express the thought, we must analyze it, the analytic order of statement appears certainly the most direct and natural. On the subordinate matter of the order of the premises, I do not here touch.

But to speak of the process in general : Without the power of reasoning we should have been limited in *Utility of the process of reasoning.* our knowledge (if knowledge of such a limitation would deserve the name of knowledge at all)—I say, without reasoning, we should have been limited to a knowledge of what is given by immediate intuition; we should have been unable to draw any inference from this knowledge, and have been shut out from the discovery of that countless multitude of truths, which, though of high, of paramount importance, are not self-evident. This faculty is, likewise, of peculiar utility, in order to protect us, in our cogitations, from error and falsehood, and to remove these if they have already crept in. For every, the most complex, web of thought may be reduced to simple syllogisms; and when this is done, their truth or falsehood, at least in a logical relation, flashes at once into view.

Of the terms by which this process is denominated, *2. Terms by which the process of Reasoning is denominated.* *Reasoning* is a modification from the French *raisonner* (and this a derivation from the Latin *ratio*), and corresponds to *ratioci-* *Reasoning. Ratiocination.* *natio*, which has indeed been immediately transferred into our language under the form *ratiocination*. *Ratiocination* denotes properly the process, but, improperly, also the product of reasoning ; *Ratiocinium* marks exclusively the product. The original mean- *Discourse.* ing of *ratio* was *computation*, and, from the calculation of numbers, it was transferred to the process of mediate comparison in general. *Discourse* (*discursus*, διάνοια) indicates the operation of comparison, the running backward and forward between the characters or notes of objects (*discur-*

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rere inter notas, διανοεῖσθαι); this term may, therefore, be properly applied to the Elaborative Faculty in general, which I have just called the Discursive. The terms *discourse* and *discursus,* διάνοια, are, however, often, nay generally, used for the reasoning process, strictly considered, and *discursive* is even applied to denote mediate, in opposition to intuitive, judgment, as is done by Milton. The compound term, *discourse of reason,* unambiguously marks its employment in this

Argumentation.
Argument.

sense. *Argumentation* is derived from *argumentari,* which means *argumentis uti; argument* again, *argumentum*—what is assumed in order to argue something—is properly the middle notion in a reasoning—that through which the conclusion is established; and by the Latin Rhetoricians it was defined, "probabile inventum ad faciendam fidem." It is often, however, applied

Inference.

as coëxtensive with *argumentation. Inference* or *Illation* (from *infero*), indicates the carrying out into the last proposition what was virtually contained

To conclude.

in the antecedent judgments. *To conclude* (*concludere*), again, signifies the act of connecting and shutting into the last proposition the two notions

Conclusion.

which stood apart in the two first. A *conclusion* (*conclusio*) is usually taken, in its strict or proper signification, to mean the last proposition of a reasoning; it is sometimes, however, used to express the product of the whole process. *To syllogize*

To Syllogize.
Syllogism.

means to form syllogisms. *Syllogism* (συλλογισμὸς) seems originally, like *ratio,* to have denoted a *computation*—an *adding up*; and, like the greater part of the technical terms of Logic in general, was borrowed by Aristotle from the mathematicians. This primary meaning of these two words favors the theory of those philosophers, who, like Hobbes and Leidenfrost, maintain that all thought is, in fact, at bottom only a calculation, a reckoning. Συλλογισμὸς may, however, be considered as expressing only what the composition of the word denotes—*a collecting together;*

for συλλογίζεσθαι comes from συλλέγειν, which signifies *to collect*. Finally, in Latin, a syllogism is called *collectio*, and to reason *colligere*. This refers to the act of collecting, in the conclusion, the two notions scattered in the premises.

Collectio.

From what has already been said touching the character of the reasoning process, it is easy to see what are the general conditions which every syllogism supposes. For, as the essential nature of reasoning consists in this—that some doubt should be removed by the application to it of some decisive general rule, there are to every syllogism three, and only three, requisites necessary: 1°. A doubt—which of two contradictory predicates must be affirmed of a certain subject—the problem or question (problema, quæsitum); 2°. The application of a decisive general rule to the doubt; and, 3°. The general rule itself. But these requisites, when the syllogism is constructed and expressed, change their places; so that the general rule stands first, the application of it to the doubt stands second, and the decision in regard to the doubt itself stands last. Each of these necessary constituents of a syllogism forms by itself a distinct, though a correlative, proposition; every syllogism, therefore, contains three propositions, and these three propositions, in their complement and correlation, constitute the syllogism. It will be proper, however, here to dictate a paragraph, expressive of the denominations technically given to the parts, which proximately make up the syllogism.

The general conditions of syllogism.

¶ LIV. A Reasoning or Syllogism is composed of two parts—that which determines or precedes, and that which follows or is determined. The one is called the *Antecedent* (*antecedens*); the other, the *Consequent* (*consequens*). The Antecedent comprises the two propositions, the one of which enounces the general rule, and the other its application. These, from their naturally preceding the consequent, are called the *Premises* (*propositiones præmissæ, sumptiones, mem-*

bra antecedentia, λήμματα). Of the premises, the one which
enounces the general rule, or the relation

LIV. Denominations
of the parts which prox-
imately make up the
syllogism.

of the greatest quantity to the lesser, is
called the *Major Premise,* or *Major Prop-
osition,* or the *Proposition* simply (*propositio
major, propositio prima, propositio, sumptum,
sumptio major, sumptio, thesis, expositio, intentio, πρόσληψις,
πρότασις ἡ μείζων, λῆμμα τὸ μεῖζον).* The other premise,
which enounces the application of the general rule, or the
relation of the lesser quantity to the least, is called the *Minor
Premise,* the *Minor Proposition,* the *Assumption,* or the *Sub-
sumption (propositio minor, propositio altera, assumptio, sub-
sumptum, subsumptio, sumptio minor, πρότασις ἡ ἐλάττων,
λῆμμα τὸ ἔλαττον).* It is manifest that, in the counter-quan-
tities of Breadth and Depth, the two premises will hold an
opposite relation of major and minor, of rule and application.
The Consequent is the final proposition, which enounces the
decision, or the relation of the greatest quantity to the least,
and is called the *Conclusion (conclusio, conclusum, propositio
conclusa, collectio, complexio, summa, connexio, illatio, intentio,*
and, in Greek, *συμπέρασμα, τὸ συναγόμενον, τὸ ἐπιφερόμε-
νον).* This part is usually designated by the conjunction
Therefore (ergo, ἄρα), and its synonyms. The conclusion is
the *Problem (problema), Question (quæstio, quæsitum),* which
was originally asked, stated now as a decision. The problem
is usually omitted in the expression of a syllogism, but is one
of its essential parts. The whole nomenclature of the syllo-
gistic parts, be it observed, has reference to the one-sided
views of the logicians in regard to the process of reasoning.

The Syllogism is divided into two parts, the Antecedent
and the Consequent—the antecedent com-

Explication.
Antecedent and
Consequent.

prehending the two propositions, in which
the middle notion is compared with the two
notions we would compare together; and the
consequent comprising the one proposition, which explicitly

enounces the relation implicitly given in the prior of these two notions to each other.

The two propositions which constitute the antecedent are

Premises.

called, among other names, the *Premises*. Of these, the proposition expressing the relation of whole, which one of the originally given notions holds to the assumed or middle notion as its part, is called,

Major.

among other appellations, the *Major Proposition*, the *Major Premise*, or *The Proposition*, κατ' ἐξόχην. The other proposition of the antecedent enouncing the relation of whole, which the assumed or middle notion holds to the other of the given notions as its part is called, among other appellations, the *Minor Proposition*, the

Minor.

Minor Premise, the *Assumption*, or the *Subsumption*. These, as terms of relation, vary, of course, with the relation in the counter-quantities. The one proposition, which constitutes the consequent, is called, among other appellations, the *Conclusion*. Perhaps the best

Sumption, Subsumption, and Conclusion.

names for these three relative propositions of a syllogism would be *Sumption*, *Subsumption*, *Conclusion*, as those which express, most briefly and naturally, the nature and reciprocal dependence of the three judgments of a syllogism. The expressions *Sumption* and *Subsumption* are appropriate

Grounds of their adoption as best names for the three propositions of a syllogism.

logical expressions, in consequence of their both showing that Logic considers them, not as absolutely, but only as hypothetically true; for Logic does not warrant the truth of the premises of a syllogism; it only, on the supposition that these premises are true, guarantees the legitimacy of the inference—the necessity of the conclusion. It is on this account that the premises have, by the Greek logicians, been

Lemma.

very properly styled λήμματα, corresponding to the Latin *sumptiones;* and were there any necessity to resort to Greek, the Major Proposition, which I would call *Sumption (sumptio)*, might be well denominated

Lemma simply; and the Minor Proposition, which I would call the *Subsumption (subsumptio)*, might be well denominated the *Hypolemma*.

In regard to the proposition constituting the consequent of a syllogism, the name which is generally bestowed on it—the *Conclusion*—is not exposed to any serious objections. There is thus no reason why it should be superseded, and there is in fact no other term entitled to a preference. So much in reference to the terms by which the proximate parts of a syllogism are denoted. I now proceed to state to you in general the Division of Syllogisms into Species determined by these parts, and shall then proceed to consider these several species in detail. But I have first of all to state to you a division of Syllogisms, which, as comprehending, ought to precede all others. It is that of Syllogisms into Extensive and Comprehensive.

The Conclusion.

¶ LV. The First Division of Syllogisms is taken from the different kinds of quantity under which the reasoning proceeds.

For while every syllogism infers that the part of a part is a part of the whole, it does this either in the quantity of Extension—the Predicate of the two notions compared in the Question and Conclusion being the greatest whole, and the Subject the smallest part; or in the counter-quantity of Comprehension—the Subject of these two notions being the greatest whole, and the Predicate the smallest part.

LV. First Division of Syllogisms into Extensive and Comprehensive.

After what I have already stated in regard to the nature of these opposite quantities, under the doctrine of Concepts and Judgments, and after the illustrations I have given you of the possibility of conducting any reasoning in either of these quantities at will—every syllogism in the one quantity being convertible into a syllogism absolutely equivalent in the other quantity—it will be here needless to enlarge upon the nature

of this distinction in general. This distinction comprehends all others; and its illustration, therefore, supposes that the nature of the various subordinate classes of syllogisms should be previously understood. It will, therefore, be expedient, not at present to enter on any distinct consideration of this division of reasonings, but to show, when treating of syllogisms under their various subaltern classes, how each is capable of being cast in the mold of either quantity, and not, as logicians suppose, in that of extensive quantity alone.

The next distinction of Syllogisms is to be sought for either in the constituent elements of which they

Matter and form of Syllogisms. are composed, or in the manner in which these are connected. The former of these is technically called the *matter* of a syllogism, the latter its *form*. You must, however, observe that these terms are here used in a restricted meaning. Both matter and form under this distinction are included in the form of a syllogism, when we speak of form in contrast to the empirical matter which it may contain. This, therefore, is a distinction under that form with which Logic, as you know, is exclusively conversant; and the matter here spoken of should be called, for distinction's sake, the *formal or necessary matter* of a syllogism. In this sense, then, the matter of a syllogism means merely the propositions and terms of which every syllogism is necessarily made up; whereas, otherwise, the form of a syllogism points out the way in which these constituents are connected. This being understood, I repeat that the next distinction of syllogisms is to be sought for either in their matter or in their form.

Now in regard to their matter, syllogisms can not differ, for every syllogism, without exception, requires

Their form, the ground of the next grand distinction of syllogisms. the same constituent parts—a question, the subsumption of it under a general rule, and the sumption of the general rule itself; which three constituents, in the actual enunciation of a syllogism, change, as I have already noticed, their relative situation ; what was first in the order of thought being last in the order of expression.

The difference of Syllogisms can, therefore, only be sought for in their different forms; so that their distinctions are only formal. But the form of a syllogism, considered in its greatest generality, is of a twofold kind, viz., either an Internal and Essential, or an External and Accidental. The former of these depends on the relations of the constituent parts of the syllogism to each other, as determined by the nature of the thinking subject itself; the latter of these depends on the external expression of the constituent parts of the syllogism, whereby the terms and propositions are variously determined in point of number, position, and consecution. We must, therefore, in conformity to the order of nature, first of all, consider what classes of syllogism are given by their internal or essential form; and thereafter inquire what are the classes afforded by their external or accidental modifications. First, then, in regard to the Internal or Essential Form of Syllogism.

The form of Syllogism twofold, Internal and External.

A Syllogism is only a syllogism when the conclusion follows from the premises with an absolute certainty; and as this certainty is determined by a universal and necessary law of thought, there must, consequently, be as many kinds of Syllogism as there are various kinds of premises affording a consequence in virtue of a different law. Between the premises there is only one possible order of dependency, for it is always the sumption—the major premise, which, as the foundation of the whole syllogism, must first be taken into account. And in determining the difference of syllogisms, the sumption is the only premise which can be taken into account as affording a difference of syllogism; for the minor premise is merely the subsumption of the lesser quantity of the two notions, concerning whose relation we inquire, under the question, and this premise always appears in one and the same form—in that, namely, of a categorical proposition. The same is, likewise, the case in regard to the conclusion, and, therefore, we can no more look toward the conclusion for a determination of the diversity of syllogism than toward the subsumption. We

have thus only to inquire in regard to the various possible kinds of major proposition.

Now, as all sumptions are judgments, and as we have already found that the most general division of judg-

Syllogisms to be divided according to the character of their sumptions and the law regulating the connection between premises and conclusion. ments, next to the primary distinction of intensive and extensive, is into simple and conditional, this division of judgments, which, when developed, affords the classes of categorical, disjunctive, hypothetical, and hypothetico-disjunctive propositions, will furnish us with all the possible differences of major premises. It is also manifest that in any of these aforesaid propositions (categorical, disjunctive, hypothetical, and hypothetico-disjunctive), a decision of the question—which of two repugnant predicates belongs to a certain subject—can be obtained according to a universal and necessary law. In a categorical sumption, this is competent through the laws of Identity and Contradiction; for what belongs or does not belong to the superordinate notion, belongs or does not belong to the subordinate. In disjunctive sumptions, this is competent through the law of Excluded Middle; since of all the opposite determinations one alone belongs to the object; so that if one is affirmed, the others must be, conjunctively, denied; and if one is denied, the others must be disjunctively, at least, affirmed. In hypothetical sumptions, this is competent through the law of Reason and Consequent; for where the reason is, there must be the consequent, and where the consequent is, there must be the reason.* There are thus obtained three or four great classes of Syllo-

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* This classification of syllogisms can not be regarded as expressing the author's final view; according to which, the principal of Reason and Consequent is not admitted as a law of thought. In a note by Sir W. Hamilton, appended to Mr. Bayne's *Essays on the New Analytic of Logical Forms*, the author's later view is expressed as follows: "All *Mediate* inference is one—that incorrectly called *Categorical;* for the *Conjunctive* and *Disjunctive* forms of *Hypothetical* reasoning are reducible to immediate inferences."

gisms, whose essential characteristics I shall comprise in the following paragraph :

¶ LVI. Syllogisms are divided into different classes, according as the connection between the premises and conclusion is determined by the different fundamental laws 1°. of Identity and Contradiction; 2°. Of Excluded Middle; 3°. Of Reason and Consequent; these several determinations affording the three classes of *Categorical*, of *Disjunctive*, and of *Hypothetical Syllogisms.* To these may be added a fourth class, the *Hypothetico-disjunctive* or *Dilemmatic Syllogism*, which is determined by the two last laws in combination.

LVI. Second grand division of Syllogisms—according to the law regulating the inference.

Before proceeding to a consideration of these several syllogisms in detail, I shall, first of all, give you examples of the four species together, in order that you may have, while treating of each, at least a general notion of their differences and similarity.

Examples of the four species of Syllogism.

1. Categorical.   1.—OF A CATEGORICAL SYLLOGISM.

       Sumption..........*All matter is created;*
       Subsumption......*But the heavenly bodies are material;*
       Conclusion........*Therefore, the heavenly bodies are created.*

2. Disjunctive.   2.—OF A DISJUNCTIVE SYLLOGISM.

       Sumption..........*The hope of immortality is either a rational expectation or an illusion;*
       Subsumption.....*But the hope of immortality is a rational expectation;*
       Conclusion........*Therefore, the hope of immortality is not an illusion.*

3. Hypothetical.   **3.—Of a Hypothetical Syllogism.**

> Sumption..........*If Logic does not profess to be an instrument of invention, the reproach that it discovers nothing is unfounded;*
>
> Subsumption.....*But Logic does not profess to be an instrument of invention;*
>
> Conclusion.........*Therefore, the reproach that it discovers nothing is unfounded.*

4. Hypothetico-dis-   **4.—Of the Dilemma or Hypothetico-dis-**
junctive.   **junctive Syllogism.**

> Sumption..........*If man were suited to live out of society, he would either be a god or a beast;*
>
> Subsumption......*But man is neither a god nor a beast;*
>
> Conclusion........ *Therefore, he is not suited to live out of society.*

I now go on to the special consideration of the first of these classes of Syllogism—viz., the Syllogism which has been denominated *Categorical.* And in regard to the meaning and history of the term *categorical*, it will not be necessary to say anything in addition to what I have already stated in speaking of judgments. As used originally by Aristotle, the term *categorical* meant merely *affirmative*, and was opposed to *negative.* By Theophrastus it was employed in the sense of absolute, simple, direct, and as opposed to *conditional;* and in this signification it has continued to be employed by all subsequent logicians, without their having been aware that Aristotle never employed it in the meaning in which alone they used it.

I. Simple Syllogism. The Categorical.

The term Categorical.

¶ LVII. A Categorical Syllogism is a reasoning whose form is determined by the laws of Identity and Contradiction, and whose sumption is thus a categorical proposition. In a Categorical Syllogism there are three principal notions, holding to each

LVII. The Categorical Syllogism—what.

other the relation of whole and part; and these are so com-
bined together, that they constitute three propositions, in which
each principal notion occurs twice. These notions are called
Terms (*termini*, ὅροι), and according as the notion is the great-
est, the greater, or the least, it is called the *Major*, the *Middle*,
or the *Minor Term*. The Middle Term is called the *Argument*
(*argumentum*, λόγος, πίστις); the Major and Minor Terms are
called *Extremes* (*extrema*, ἄκρα). If the syllogism proceed in
the quantity of Extension (and this form alone has been consid-
ered by logicians), the predicate of the conclusion is the great-
est whole, and, consequently, the Major Term; the subject of
the conclusion, the smallest part, and, consequently, the Minor
Term. If the syllogism proceed in the quantity of Compre-
hension, the subject of the conclusion is the greatest whole,
and, consequently, the Major Term; the predicate of the con-
clusion, the smallest part, and, consequently, the Minor Term.
In either quantity, the proposition in which the relation of the
major term to the middle is expressed, is the *Sumption* or
Major Premise, and the proposition in which is expressed the
relation of the middle term to the minor, is the *Subsumption*
or *Minor Premise*. The general forms of a Categorical Syllo-
gism under the two quantities, are, consequently, the following:

AN EXTENSIVE SYLLOGISM.	AN INTENSIVE SYLLOGISM.
B *is* A	C *is* B
C *is* B	B *is* A
C *is* A	C *is* A
All man is mortal;	*Caius is a man;*
But Caius is a man;	*But all man is mortal;*
Therefore, Caius is mortal.	*Therefore, Caius is mortal.*

In these examples, you are aware, from what has previously
been said, that the copula in the two differ-
ent quantities is precisely of a counter-mean-
ing; in the quantity of extension, signifying *contained under;*
in the quantity of comprehension, signifying *contains in it.*

Explication.

Thus, taking the several formulæ, the Extensive Syllogism will, when explicitly enounced, be as follows : ·

Example of the Extensive Categorical Syllogism.

The Middle term B is contained under the Major term A ;

But the Minor term C is contained under the Middle term B ;

Therefore, the Minor term C is also contained under the Major term A.

Or, to take the concrete example :

The Middle term all men is contained under the Major term mortal ;
But the Minor term Caius is contained under the Middle term all men;
Therefore, the Minor term Caius is also contained under the Major term mortal.

Of the Intensive.

On the contrary the Intensive Syllogism, when explicated, is as follows :

The Major term C contains in it the Middle term B;
But the Middle term B contains in it the Minor term A ;
Therefore, the Major term C also contains in it the Minor term A.

Or, in the concrete example :

The Major term Caius contains in it the Middle term man ;
But the Middle term man contains in it the Minor term mortal ;
Therefore, the Major term Caius also contains in it the Minor term mortal.

Thus you see that by reversing the order of the two premises, and by reversing the meaning of the copula, we can always change a categorical syllogism of the one quantity into a categorical syllogism of the other.

Before leaving the consideration of the terms of a syllogism, I may notice that the most convenient mode of stating a syllo-

gism in an abstract form, is by the letters S, P, and M—S sig-

nifying the subject, as P the predicate, of the conclusion, and M the middle term of the syllogism. This you will be pleased to recollect, as we shall find it necessary to employ this notation in showing the differences of syllogisms from the different arrangement of their terms.

I have formerly stated that categorical syllogisms are regu-

lated by the fundamental laws of Identity and Contradiction ; the law of Identity regulating Affirmative, the law of Contradiction, Negative, Categoricals.   As, however, the laws of Identity and Contradiction are capable of certain special applications, these will afford the ground of a division of Categorical Syllogisms into a corresponding number of classes.   It has been already stated, that all reasoning is under the relation of whole and part, and, consequently, the laws of Identity and Contradiction will find their application to categorical syllogisms only under this relation.

But the relation of whole and part may be regarded in two

points of view ; for we may either look from the whole to the parts, or look from the parts to the whole.   This being the case, may we not apply the principles of Identity and Contradiction in such a way that we either reason from the whole to the parts, or from the parts toward the whole ?   Let us consider : looking at the whole and the parts together on the principle of Identity, we are assured that the whole and all its parts are one—that whatever is true of the one is true of the other—that they are only different expressions for the different aspects in which we may contemplate what in itself is absolutely identical.   On the principle, therefore, that the whole is only the sum of the parts,

I am entitled, on the one hand, looking from the whole to its parts, to say with absolute certainty, What belongs to a whole belongs to its part; and what does not belong to a whole does not belong to its part: and on the other, looking from the parts to their whole, to say, What makes up all the parts constitutes the whole; and what does not make up all the parts does not constitute the whole. Now, these two applications of the principles of Identity and Contradiction, as we look from one term of the relation of whole and part, or from the other, determine two different kinds of reasoning. For if we reason downward, from a containing whole to a contained part, we shall have one sort of reasoning which is called the *Deductive;* whereas, if we reason upward, from the constituent parts to a constituted whole, we shall have another sort of reasoning, which is called the *Inductive.* This I shall briefly express in the following paragraph :

¶ LVIII. Categorical Syllogisms are *Deductive,* if, on the principles of Identity and Contradiction, we

LVIII. Categorical Syllogisms divided into Deductive and Inductive.

reason downward, from a containing whole to a contained part; they are *Inductive,* if, on these principles, we reason upward, from the constituent parts to a constituted whole.

This is sufficient at present to afford you a general conception of the difference of Deductive and In-

I. Deductive Categorical Syllogisms.

ductive Categoricals. The difference of these two kinds of reasoning will be properly explained, when, after having expounded the nature of the former, we proceed to consider the nature of the latter. We shall now, therefore, consider the character of the deductive process—the process which has been certainly and most successfully analyzed by logicians ; for, though their treatment of deductive reasoning has been one-sided and imperfect, it is not positively erroneous ; whereas, their analysis of the inductive process is at

once meager and incorrect. And, first, of the proximate canons by which Deductive Categoricals are regulated.

¶ LIX. In Deductive Categoricals the universal laws of Identity and Contradiction take two modified

LIX. Deductive Categoricals—their canons. forms, according as these syllogisms proceed in the quantity of Comprehension or in that of Extension. The peculiar canon by which Intensive Syllogisms of this class are regulated, is, What belongs to the predicate belongs also to the subject; what is repugnant to the predicate, is repugnant also to the subject. The peculiar canon by which Extensive Syllogisms of this class are regulated is, What belongs to the genus belongs to the species and individual; what is repugnant to the genus, is repugnant to the species and individual. Or, more briefly, What pertains to the higher class pertains also to the lower.

¶ LX. An Extensive Categorical Syllogism, if regularly and fully expressed, is governed by the three

LX. The Three Rules of the Extensive Categorical Syllogism. following rules :

I. It must have three, and only three, Terms, constituting three, and only three, Propositions.

II. Of the premises, the Sumption must in quantity be Definite (i. e. universal or singular), and the Subsumption in quality Affirmative.

III. The Conclusion must correspond in Quantity with the Subsumption, and in Quality with the Sumption.

These three simple laws comprise all the rules which logicians lay down with so confusing a minute-

Illustration. First Rule. ness. The first is : A categorical syllogism, if regular and perfect, must have three, and only three, propositions, made up of three, and only three, terms. The necessity of this rule is manifest from the very notion of a categorical syllogism. In a categorical syllogism

the relation of two notions to each other is determined through their relation to a third; and, consequently, each must be compared once with the intermediate notion, and once with each other. It is thus manifest that there must be three, and can not possibly be more than three, terms; and that these three terms must in their threefold comparison, constitute three, and only three, propositions. It is, however, to be observed, that it may often happen as if, in a valid syllogism, there were more than three principal notions—three terms. But, in that case, the terms or notions are only complex, and expressed by a plurality of words. Hence it is, that each several notion extant in a syllogism, and denoted by a separate word, is not on that account to be viewed as a logical term or terminus, but only those which, either singly or in connection with others, constitute a principal momentum of the syllogism. Thus, in the following syllogism, there are many more than three several notions expressed by three several words, but these, we shall find, constitute in reality only three principal notions or logical terms:

What is properly to be regarded as a logical term.

Sumption......*He who conscientiously performs his duty is a truly good man;*
Subsumption.*Socrates conscientiously performs his duty;*
Conclusion....*Therefore, Socrates is a truly good man.*

Here there are in all seven several notions denoted by seven separate words: 1. *Conscientiously,* 2. *Performs,* 3. *Duty,* 4. *Truly,* 5. *Good,* 6. *Man,* 7. *Socrates;* but only three principal notions or logical terms, viz.: 1. *Conscientiously performs his duty,* 2. *Truly good man,* 3. *Socrates.*

When, on the other hand, the expression of the middle term in the sumption and subsumption is used in two significations, there may, in that case, appear to be only three terms, while there are in reality four; or as it is technically styled in logic, a *quaternio termi-norum.* On this account, the syllogism is vicious in point of

Quaternio Terminorum.

form, and, consequently, can afford no inference, howbeit that
the several propositions may, in point of matter, be all true.
And why?   Because there is here no mediation, consequently
no connection between the different terms of the syllogism.
For example:

> *The animals are void of reason;*
> *Man is an animal;*
> *Therefore, man is void of reason.*

Here the conclusion is invalid, though each proposition, by
itself, and in a certain sense, may be true.   For here the
middle term, *animal*, is not taken in the same meaning in the
major and minor propositions.   For in the former, it is taken
in a narrower signification, as convertible with *brute*, in the
latter in a wider signification, as convertible with *animated
organism.*

The second rule is : Of the premises, the sumption must in
quantity be definite (universal or singular),
the subsumption must in quality be affirma-
tive.   The sumption must in reference to its quantity be defi-
nite ; because it affords the general rule of the syllogism.   For
if it were indefinite, that is, particular, we should have no
security that the middle term in the subsumption comprised
the same part of the sphere which it comprised in the sump-
tion.

Second Rule.

Thus :

> *Some* M *are* P;
> *All* S *are* M;
> ———————
> *All* S *are* P.

Or, in a concrete example :

> *Some works of art are cubical;*
> *All pictures are works of art;*
> *Therefore, all pictures are cubical.*

In regard to the subsumption, this is necessarily affirmative. The sumption is not limited to either quality, because the proposition enouncing a general rule may indifferently declare *All M is* P, and *No* M *is* P. The assumption is thus indeterminate in regard to quality. But not so the proposition enouncing the application of a general rule. For it must subsume, that is, it must affirm, that something is contained under a condition; and is, therefore, necessarily affirmative. We must say S *is* M. But in respect of quantity it is undetermined, for we can either say *All* S *is* M, or *Some* S *is* M. If the subsumption is negative, there is no inference; for it is not necessary that a genus should contain only things of a certain species. This is shown in the following example:

> *All men are animals;*
> *No horse is a man;*
> *Therefore, no horse is an animal.*

Or, as abstractly expressed:

> *All* M *are* P;
> *But no* S *is* M;
> ———————————
> *No* S *is* P.

Thus it is, that in a regular extensive categorical syllogism, the sumption must be always definite in quantity, the subsumption always affirmative in quality.

I have, however, to add an observation requisite to prevent the possibility of a misconception. In stating it as a rule of extensive categoricals, that the sumption must be definite (universal or singular), if you are at all conversant with logical books, you will have noticed that this rule is not in unison with the doctrine therein taught, and you may, accordingly, be surprised that I should enounce as a general rule what is apparently contradicted by the fact that

Misconception in regard to definiteness of sumption in second rule obviated.

there are syllogisms—valid syllogisms—of various forms, in which the sumption is a particular, or the subsumption a negative, proposition. In explanation of this, it is enough at present to say, that in these syllogisms the premises are transposed in the expression. You will, hereafter, find that the sumption is not always the proposition which stands first in the enunciation, as the conclusion is not always the proposition which stands last. Such transpositions are, however, only external accidents, and the mere order in which the premises and conclusion of a syllogism are enounced, no more changes their nature and their necessary relation to each other, than does the mere order in which the grammatical parts of a sentence are expressed, alter their essential character and reciprocal dependence. In the phrases *vir bonus* and *bonus vir*—in both, the *vir* is a substantive and the *bonus* an adjective. In the sentence variously enounced—*Alexander Darium vicit*—*Alexander vicit Darium*—*Darium Alexander vicit*—*Darium vicit Alexander*—*Vicit Alexander Darium*—*Vicit Darium Alexander*—in these, a difference of order may denote a difference of the interest we feel in the various constituent notions, but no difference of their grammatical or logical relations. It is the same with syllogisms. The mere order of enunciation does not change a sumption into a subsumption, nor a subsumption into a sumption. It is their essential relation and correlation in thought which constitutes the one proposition a major, and the other a minor premise. If the former precede the latter in the expression of the reasoning, the syllogism is technically regular; if the latter precede the former, it is technically irregular or transposed. This, however, as you will hereafter more fully see, has not been attended to by logicians, and in consequence of their looking away from the internal and necessary consecution of the premises to their merely external and accidental arrangement, the science had been deformed and perplexed by

The mere order of enunciation does not constitute the sumption or subsumption in a reasoning.

What truly constitutes the sumption and subsumption in a reasoning.

the recognition of a multitude of different forms, as real and distinct, which exist only, and are only distinguished, by certain fortuitous accidents of expression. This being understood, you will not marvel at the rule in regard to the quantity of sumptions in extensive syllogisms (which, however, I limited to those that were regularly and fully expressed), that it must be definite. Nor will you marvel at the counter canon in regard to the quality of sumptions in intensive syllogisms—that it must be affirmative.

The necessity of the last rule is equally manifest as that of the preceding. It is: The conclusion must correspond in quantity with the subsumption, and in quality with the sumption. This rule is otherwise enounced by logicians: The conclusion must always follow the weaker or worser part—the negative and the particular being held to be weaker or worser in relation to the affirmative and universal. The conclusion, in extensive categoricals (with which we are at present occupied) is made up of the minor term, as subject, and of the major term, as predicate. Now, as the relation of these two terms to each other is determined by their relation to the middle term, and as the middle term is compared with the major term in the sumption; it follows that the major term must hold the same relation to the minor in the conclusion which it held to the middle in the sumption. If, then, the sumption is affirmative, so likewise must be the conclusion; on the other hand, if the sumption be negative, so likewise must be the conclusion. In the subsumption, the minor term is compared with the middle; that is, the minor is affirmed as under the middle. In the conclusion, the major term can not, therefore, be predicated of more things than were affirmed as under the middle term in the subsumption. Is the subsumption, therefore, universal, so likewise must be the conclusion; on the contrary, is the former particular, so likewise must be the latter.

Third Rule.

We have next to consider into what rules the law of Intensive

or Comprehensive Syllogism is developed, in its more proximate application. Now, as the intensive and ex-

tensive syllogisms are always the counterparts of each other, the proximate rules of the two forms must, consequently, be either precisely the same, or precisely the converse of each other. Accordingly, taking the three rules of extensive syllogisms, we find that the first law is also, without difference, a rule of intensive syllogisms. But the second and third, to maintain their essential identity, must be externally converted; for to change an extensive syllogism into an intensive, we must transpose the order or subordination of the two premises, and reverse the reciprocal relation of the terms. The three general rules of an Intensive Categorical Deductive Syllogism will, therefore, stand as follows:

¶ LXI. An Intensive Categorical Deductive Syllogism, that is, one of Depth, if regularly and fully ex-
pressed, is governed by the three following rules:

I. It must have three, and only three, terms—constituting three, and only three, propositions.

II. Of the premises, the Sumption must in quality be Affirmative, and the Subsumption in quantity Definite (that is, universal or singular).

III. The Conclusion must not exceed the Sumption in Quantity, and in Quality must agree with the Subsumption.

In regard to the first of these rules—the rule which is identical for syllogisms whether extensive or in-
tensive, it is needless to say anything; for all that I stated in regard to it under the first of these forms, is valid in regard to it under the second.

I proceed to the second, which is: The sumption must in quality be affirmative, the subsumption must in quantity be

definite (that is, universal or singular). And, here, we have
to answer the question, Why in an intensive

Second Rule.   syllogism must the sumption be affirmative
in quality, the subsumption definite in quantity ? Let us take
the following syllogism as explicated :

> S *comprehends* M ;
> M *does not comprehend* P ;
> *Therefore,* S *does not comprehend* P.

> *Prudence comprehends virtue;*
> *But virtue does not comprehend blameworthy ;*
> *Therefore, prudence does not comprehend blameworthy.*

Here all goes on regularly. We descend from the major term
prudence to the middle term *virtue*, and from the middle term
virtue to the minor term *blameworthy*. But let us reverse the
premises. We at once see that though there is still a discover-
able meaning, it is not directly given, and that we must rectify
and restore in thought what is perverse and preposterous in
expression. In the previous example, the sumption is affirma-
tive, the subsumption negative. Now let us take a negative
sumption :

> S *does not comprehend* M ;
> *But* M *comprehends* P.

Here there is no conclusion competent, for we can neither say
S *comprehends* P, nor S *does not comprehend* P. Or, to take a
concrete example :

> *Prudence does not comprehend learning ;*
> *But learning comprehends praiseworthy.*

We can draw, it is evident, no conclusion ; for we can neither
say, from the relation of the two propositions, that *Prudence
comprehends praiseworthy*, nor that *Prudence does not compre-
hend praiseworthy.*

The reason why an extensive syllogism requires a universal sumption, and an intensive syllogism an affirm-

Grounds of the rules regarding Sumption and Subsumption in Extensive and Comprehensive Syllogisms.

ative, and why the one requires an affirmative and the other a definite subsumption, is the following: The condition common to both syllogisms is that the sumption should express a rule. But in the extensive syllogism this law is a universal rule, that is, a rule to which there is no exception; but then it may be expressed either in an affirmative or in a negative form, whereas in the intensive syllogism this law is expressed as a position, as a fact, and, therefore, admits only of an affirmative form, but, as it is not necessarily universal, it admits of limitations or exceptions. This opposite character of the sumptions of the two forms of syllogisms is correspondent to the opposite character of their subsumptions. In the extensive syllogism, the subsumption is, and can only be, an affirmative declaration of the application of the sumption as a universal rule. In the intensive syllogism, the subsumption is either an affirmation or a negation of the application of the sumption as a positive law. Hence it is that in an intensive syllogism the major premise is necessarily an affirmative, while the minor may be either an affirmative or a negative proposition.

In regard to the second clause of the second rule, the reason why the subsumption in an intensive syllogism must be definite in quantity, is because it would otherwise be impossible to affirm or deny of each other the minor and the major terms in the conclusion. For example:

Sumption.........*Prudence is a virtue;* i. e., *Prudence comprehends virtue.*
Subsumption.... *Some virtue is praiseworthy;* i. e., *Some virtue comprehends praiseworthy.*

From these we can draw no conclusion, for the indefinite *some virtue* does not connect the major term *prudence* and the minor term *praiseworthy* into the necessary relation of whole and part.

In regard to the third rule—The conclusion must be corres-

Third Rule. pondent in quantity with the sumption, and in quality with the subsumption—it is not necessary to say anything. Here, as in the extensive syllogism, the conclusion can not be stronger than the weakest of its antecedents ; that is, if any premise be negative, the conclusion can not but be negative also ; and if any premise be particular, the conclusion can not be but particular likewise ; and as a weaker quality is only found in the subsumption, and a weaker quantity in the sumption, it follows that (as the rule declares) the conclusion is regulated by the sumption in regard to its quantity, and by the subsumption in regard to its quality. It is, however, evident, that though warranted to draw a universal conclusion from a general sumption, it is always competent to draw only a particular.

¶ LXII. An Inductive Categorical Syllogism is a reasoning in which we argue from the notion of all the **LXII. Inductive** constituent parts discretively, to the notion **Categorical Syllogism** of the constituted whole collectively. Its **—what.** general laws are identical with those of the Deductive Categorical Syllogism, and it may be expressed, in like manner, either in the form of an Intensive or of an Extensive Syllogism.

All you will find in logical works of the character of logical induction is utterly erroneous ; for almost all logicians, except Aristotle, consider induction, not as regulated by the necessary laws of thought, but as determined by the probabilities and presumptions of the sciences from which its matter has accidentally been borrowed. They have not considered it logically, in its formal, but only, extralogically, in its material conditions. Thus, logicians have treated in Logic of the inductive inference from the parts to the whole, not as exclusively warranted by the law of Identity, in the convertibility of the whole and all its parts, but they have attempted to establish an illation from a few of these parts to the whole ; and this, either

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as supported by the general analogies of nature, or by the special presumptions afforded by the several sciences of objective existence.

Logicians, with the exception of Aristotle, who is, however, very brief and unexplicit in his treatment of this subject, have thus deformed their science, and perplexed the very simple doctrine of logical induction, by confounding formal with material induction. All inductive reasoning is a reasoning from the parts to the whole; but the reasoning from the parts to the whole in the various material or objective sciences, is very different from the reasoning from the parts to the whole in the one formal or subjective science of Logic. In the former, the illation is not simply founded on the law of Identity, in the convertibility of a whole and all its parts, but on certain presumptions drawn from an experience or observation of the constancy of nature; so that, in these sciences, the inference to the whole is rarely from all, but generally from a small number of, its constituent parts; consequently, in them, the conclusion is rarely in truth an induction properly so called, but a mixed conclusion, drawn on an inductive presumption combined with a deductive premise. For example, the physical philosopher thus reasons:

The characters of Logical or Formal, and of Real or Material, Induction.

> *This, that, and the other magnet attract iron;*
> *But this, that, and the other magnet represent all magnets;*
> *Therefore, all magnets attract iron.*

Now, in this syllogism, the legitimacy of the minor premise, *This, that, and the other magnets represent all magnets*, is founded on the principle that nature is uniform and constant, and, on this general principle, the reasoner is physically warranted in making a few parts equivalent to the whole. But this process is wholly incompetent to the logician. The logician knows nothing of any principles except the laws of thought. He can not transcend the sphere of necessary, and pass into the sphere of probable, thinking; nor can he bring

back, and incorporate into his own formal science, the conditions which regulate the procedure of the material sciences. This being the case, induction is either not a logical process different from deduction, for the induction of the objective philosopher, in so far as it is formal, is in fact deductive; or there must be an induction governed by other laws than those which warrant the induction of the objective philosopher. Now, if logicians had looked to their own sciences, and not to

Canons of the Deductive and Inductive Syllogisms—e q u a l l y formal. sciences with which, as logicians, they had no concern, they would have seen that there is a process of reasoning from the parts to the whole, as well as from the whole to the parts, that this process is governed by its own laws, and is equally necessary and independent as the other. The rule by which the Deductive Syllogism is governed is: What belongs, or does not belong, to the containing whole, belongs, or does not belong, to each and all of the contained parts. The rule by which the Inductive Syllogism is governed is: What belongs, or does not belong, to all the constituent parts, belongs, or does not belong, to the constituted whole. These rules exclusively determine all formal inference; whatever transcends or violates them, transcends or violates Logic. Both are equally absolute. It would be not less illegal to infer by the deductive syllogism, an attribute belonging to the whole of something it was not conceived to contain as a part; than by the inductive, to conclude of the whole what is not conceived as a predicate of all its constituent parts. In either case, the consequent is not thought as determined by the antecedent; the premises do not involve the conclusion.

To take the example previously adduced as an illustration of a

These reasonings illustrated. material or philosophical induction, it would be thus expressed as a formal or logical;

This, that, and the other magnet attract iron ;
But this, that, and the other magnet are all magnets;
Therefore, all magnets attract iron.

Here the inference is determined exclusively by a law of thought. In the subsumption, it is said, *This, that, and the other magnet, etc., are all magnets.* This means, *This, that, and the other magnet are*, that is, *constitute*, or rather, *are conceived to constitute all magnets*, that is, *the whole—the class— the genus magnet*. If, therefore, explicitly enounced, it will be as follows: *This, that, and the other magnet are conceived to constitute the whole class magnet.* The conclusion is—*Therefore, all magnets attract iron.* This, if explicated, will give— *Therefore, the whole class magnet is conceived to attract iron.* The whole syllogism, therefore, as a logical induction, will be :

This, that, and the other magnet attract iron ;
But this, that, and the other magnet, etc., are conceived to constitute the genus magnet ;
Therefore, the genus magnet attracts iron.

For example, let us suppose that x, y, z, represent parts, and the letters A and B wholes, and we have the following formula of an inductive syllogism in Comprehension :

x, y, z, *constitute* A ;
A *comprehends* B ;
Therefore, x, y, z, *comprehend* B.

This, if converted into an extensive syllogism, by transposing the premises and reversing the copula, gives :

A *is contained under* B ;
x, y, z, *constitute* A ;
Therefore, x, y, z, *are contained under* B.

But in this syllogism it is evident that the premises are in an unnatural order. We must not, therefore, here transpose the premises, as we do in converting a deductive categorical of comprehension into one of extension. We may obtain an inductive syllogism in two different forms, and in either comprehension or extension, according as the parts stand for the

major, or for the middle term. If the minor term is formed of the parts, it is evident there is no induction; for, in this case, they only constitute that quantity of the syllogism which is always a part, and never a whole. Let x, y, z represent the parts; where not superseded by x, y, z, S will represent the major term in a comprehensive, and the minor term in an extensive syllogism; P will represent the major term in an extensive, and the minor term in a comprehensive syllogism, and M the middle term in both. I shall first take the Inductive Syllogism of Comprehension.

FIRST CASE.

(The parts holding the place of the major term S.)

x, y, z *constitute* M;
M *comprehends* P;
Therefore, x, y, z *comprehend* P.

SECOND CASE.

(The parts holding the place of the middle term.)

S *comprehends* x, y, z;
x, y, z *constitute* P;
Therefore, S *comprehends* P.

Again, in the Inductive Syllogism of Extension:

FIRST CASE.

(The parts holding the place of the major term P.)

x, y, z *constitute* M;
S *is contained under* M;
Therefore, S *is contained under* x, y, z.

SECOND CASE.

(The parts holding the place of the middle term.)

x, y, z *are contained under* P;
x, y, z *constitute* S;
Therefore, S *is contained under* P.

[This exposition of the nature of Inductive Reasoning will hardly be accepted as entirely satisfactory. By universal

use, the term "Induction" does not involve the mere identity of *all* the parts with the whole. We properly "induce," that is, reason in induction from one part as part to the whole. From one instance of oxygen combining with hydrogen, we infer the universal truth that these elements always combine in the same circumstances in the same way. That is, from one effect we infer a like effect—the same effect throughout the entire sphere in which the cause operates. One part of the operation of the cause implies and authorizes us to infer all parts of the operation, that is, all other effects within that causal sphere. The cause and its entire effect make up a causal whole ; just as a substance and its attributes make up a substantial whole ; and the mind, in the exercise of its discursive and identifying faculty, is as competent to infer in each, the whole—the substance or the cause, from the part—the attribute or the effect, as the part from the whole ; inasmuch as a part as much implies the whole as the whole the part—the two being complementary of each other in thought. Induction is a reasoning from the part to the whole ; as Deduction is a reasoning from the whole to the part. It is a reasoning from the part as part, that is, from a single part to the whole, inasmuch as one part just as much implies the whole as a plurality of parts. The paragraph is not strictly correct, therefore, in defining Induction to be a reasoning in which we argue from *all* the constituent parts to the whole. The reason why in ordinary material or physical induction, that is, in the application of Logical Induction to matters of fact, we often require a multiplicity of instances, is simply that we need to verify the fact that the effect is a part of the causal whole ; just as in Deduction applied to actual existences regarded as substantial wholes, we may require a multiplicity of observations to assure us that the attribute belongs to the substance—is a part of the substantial whole. The number of observations requisite in any case of actual Induction is determined solely by this consideration : how many are required to enable us to identify the cause and its sphere of operation, and the supposed effect

as actually the product of the supposed cause. If one observation suffices for this, it suffices for all the demands of Logic, in order to the valid inference. In the Inductive Syllogism, "Caius is mortal; Caius is a man; therefore, man is mortal," we are under the logical necessity of thinking "Caius" as effect of a cause operating throughout the sphere of "man;" so that "Caius" and all other men are alike parts of one causal whole. So soon as we are enabled to identify "Caius" and certain other beings as like effects of such cause, the reasoning is conclusive. The analogy to the Deductive process as applied to Being conceived as substance is perfect. Thus, in the Intensive Deductive Syllogism, "Caius is man; man is mortal; therefore, Caius is mortal," we must, before Logic will validate the conclusion, identify "Caius" as part of the notion "man," and "mortal" as part of the notion "man." In some cases of actual Deduction, one observation will suffice to verify the attribute as a part of the substantial whole; in other cases, a plurality of observations will be requisite.

It is not difficult to assign the reason why we more naturally reason deductively in substantial wholes, and inductively in causal wholes. A substantial whole—any given substance— is originally known as real by us, in the gross, as a whole; and from it as a whole, the Discursive or the Identifying faculty then proceeds to analyze into parts. In other words, in applying Thought to Substance, we ordinarily proceed from the whole to the part. In knowing objective Being as Cause, on the other hand, inasmuch as we know cause only as operating in successive time, we in thought attain a causal whole only genetically in successive parts; we proceed here, in other words, from the part to the whole.]

¶ LXIII. A Disjunctive Syllogism is a reasoning, whose form is determined by the law of Excluded Middle, and whose sumption is accordingly a disjunctive proposition, either of Contradiction (as, A *is either* B *or not* B); or of Contrariety (as, A

LXIII. A Disjunctive Syllogism—what.

is either B, *or* C, *or* D). In such a judgment, it is enounced
that B *or not* B, or that B, C, *or* D, as opposite notions taken
together and constituting a totality, are each of them a possi-
ble, and one or other of them a necessary predicate of A. To
determine which of these belongs, or does not belong to A, the
subsumption must either affirm one of the predicates, and the
conclusion, *eo ipso*, consequently, deny the other or others; or
it must deny one or more of them, and thus necessitate in the
conclusion, either the determinate affirmation of the other, or
the indeterminate affirmation of the others. A Disjunctive
Syllogism is thus either Affirmative, constituting the *Modus
ponens*, or *Modus ponendo tollens*, or Negative, constituting the
Modus tollens, or *Modus tollendo ponens*.

In each of these modes there are two cases, which I compre-
hend in the following mnemonic verses:

> (A) AFFIRMATIVE, OR MODUS PONENDO TOLLENS:
>> 1. *Falleris aut fallor ; fallor ; non falleris ergo.*
>> 2. *Falleris aut fallor ; tu falleris ; ergo ego nedum.*

> (B) NEGATIVE, OR MODUS TOLLENDO PONENS:
>> 1. *Falleris aut fallor ; non fallor ; falleris ergo.*
>> 2. *Falleris aut fallor ; non falleris ; ergo ego fallor.*

In illustration of this paragraph, I have defined a disjunc-
tive syllogism, one whose form is determined
by the law of Excluded Middle, and whose
sumption is, accordingly, a disjunctive proposition. I have
not, as logicians in general do, defined it directly, a syllogism
whose major premise is a disjunctive proposition. For though
it be true that every disjunctive syllogism has a disjunctive
major premise, the converse is not true; for
every syllogism that has a disjunctive sump-
tion is not, on that account, necessarily a dis-
junctive syllogism. For a disjunctive syllo-
gism only emerges, when the conclusion has
reference to the relation of reciprocal affirmation and negation

Explication.

A syllogism with dis-
junctive and major pre-
mise is not necessarily
a disjunctive reasoning.

subsisting between the disjunct members in the major premise, a condition not, however, contained in the mere existence of the disjunctive sumption. For example, in the syllogism:

> B *is either* C *or* D;
> *But* A *is* B;
> *Therefore,* A *is either* C *or* D.

This syllogism is as much a reasoning determined, not by the law of Excluded Middle, but solely by the law of Identity, as the following:

> B *is* C;
> A *is* B;
> *Therefore,* A *is* C.

For in both we conclude, C (in one, C *or* D) *is an attribute of* B; *but* B *is an attribute of* A; *therefore,* C (C *or* D) *is an attribute of* A—a process, in either case, regulated exclusively by the law of Identity.

This being premised, I now proceed to a closer examination of the nature of this reasoning, and shall, first, give you a general notion of its procedure; then, secondly, discuss its principle; and, thirdly, its constituent parts.

1°. The general form of the Disjunctive Syllogism may be given in the following scheme, in which you will observe there is a common sumption to the negative and affirmative modes:

1°. General view of the Disjunctive Syllogism.

(a.) **Formula for a Syllogism with two disjunct members.**

> A *is either* B *or* C.

AFFIRMATIVE, OR MODUS PONENDO TOLLENS:

> *Now* A *is* B;
> *Therefore,* A *is not* C.

NEGATIVE, OR MODUS TOLLENDO PONENS:

> *Now* A *is not* B;
> *Therefore,* A *is* C.

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Or, in a concrete example:

Sempronius is either honest or dishonest. .

AFFIRMATIVE, OR MODUS PONENDO TOLLENS:
Now, Sempronius is honest;
Therefore, Sempronius is not dishonest.

NEGATIVE, OR MODUS TOLLENDO PONENS:
Now, Sempronius is not honest;
Therefore, Sempronius is. dishonest.

This formula is, however, only calculated for the case in which there are only two disjunct members, that is, for the case of negative or contradictory opposition; for if the disjunct members are more than two, that is, if there is a positive or contrary opposition, there is then a twofold or manifold employment of the *Modus ponendo tollens* and *Modus tollendo ponens*, according as the affirmation and negation is determinate or indeterminate. If, in the *Modus ponendo tollens*, one disjunct member is determinately affirmed, then all the others are denied; and if several disjunct members are indeterminately affirmed except one, then only that one is denied. If, in the *Modus tollendo ponens*, a single member of the disjunction be denied, then some one of the others is determinately affirmed; and if several be denied, so that one alone is left, then this one is determinately affirmed. This will appear more clearly from the following formulæ. Let the common Sumption both of the *Modus ponendo tollens* and *Modus tollendo ponens* be:

(b.) **Formula for a Syllogism with m o r e than two disjunct members.**

A *is either* B, *or* C, *or* D;

I. THE MODUS PONENDO TOLLENS:

First Case.   A *is either* B *or* C *or* D;
Now A *is* B;
Therefore, A *is neither* C *nor* D.

Second Case. A *is either* B *or* C *or* D;
Now A *is either* B *or* C;
Therefore, A *is not* D.

II. THE MODUS TOLLENDO PONENS:

First Case. A *is either* B *or* C *or* D;
Now A *is not* B;
Therefore, A *is either* C *or* D.

Second Case. A *is either* B *or* C *or* D;
Now A *is neither* B *nor* C;
Therefore, A *is* D.

Or, to take these in concrete examples, let the Common Sumption be :

The ancients were in genius either superior to the moderns, or inferior, or equal.

I. THE MODUS PONENDO TOLLENS:

First Case. *The ancients were in genius either superior to the moderns, or inferior, or equal;*
Now the ancients were superior ;
Therefore, the ancients were neither inferior nor equal.

Second Case. *The ancients were in genius either superior to the moderns, or inferior, or equal.*
Now the ancients were either superior or equal;
Therefore, the ancients were not inferior.

II. THE MODUS TOLLENDO PONENS:

First Case. *The ancients were in genius either superior to the moderns, or inferior, or equal.*
Now the ancients were not inferior ;
Therefore, the ancients were either superior or equal.

Second Case. *The ancients were in genius either superior to the moderns, or inferior, or equal.*
Now the ancients were neither inferior nor equal;
Therefore, the ancients were superior.

Such is a general view of its procedure. Now, 2°. for its principle.

2°. The principle of the Disjunctive Syllogism. If the essential character of the Disjunctive Syllogism consist in this — that the affirmation or negation, or, what is a better expression, the position or sublation, of one or other of two contradictory attributes follows from the subsumption to the opposite; there is necessarily implied in the disjunctive process, that, when of two opposite predicates one is posited or affirmed, the other is sublated or denied; and, that, when the one is sublated or denied, the other is posited or affirmed. But the proposition—that of two repugnant attributes, the one being posited, the other must be sublated, and the one being sublated, the other must be posited—is at once manifestly the law by which the disjunctive syllogism is governed, and manifestly only an application of the law of Excluded Middle. For the *Modus ponendo tollens* there is the special rule : If the one character be posited the other character is sublated ; and for the *Modus tollendo ponens* there is the special rule : If the one character be sublated, the other character is posited. The law of the disjunctive syllogism is here enounced, only in reference to the case in which the members of disjunction are contradictorily opposed. An opposition of contrariety is not of purely logical concernment; and a disjunctive syllogism with characters opposed in contrariety, in fact, consists of as many pure disjunctive syllogisms as there are opposing predicates.

3°. I now go to the third and last matter of consideration— the several parts of a Disjunctive Syllogism.

3°. The several parts of a Disjunctive Syllogism. The question concerning the special laws of a disjunctive syllogism, or, what is the same thing, what is the original and necessary form of a disjunctive syllogism, as determined by its general principle or law—this question may be asked, not only in reference to the whole syllogism, but likewise in reference to its several parts. The original and necessary form of a disjunctive syllogism consists, as we have seen, in the reciprocal

position or sublation of contradictory characters, by the subsumption of one or other. Hence it follows, that the disjunctive syllogism must, like the categorical, involve a threefold judgment, viz.: 1°. A judgment in which a subject is determined by two contradictory predicates; 2°. A judgment in which one or other of the opposite predicates is subsumed, that is, is affirmed, either as existent or non-existent; and, 3°. A judgment in which the final decision is enounced concerning the existence or non-existence of one of the repugnant or reciprocally exclusive predicates. But in these three propositions, as in the three propositions of a categorical syllogism, there can only be three principal notions—viz., the notion of a subject, and the notion of two contradictory attributes, which are generally enounced in the sumption, and of which one is posited or sublated in the subsumption, in order that in the conclusion the other may be sublated or posited. The case of contrary opposition is, as we have seen, easily reconciled and reduced to that of contradictory opposition. The laws of the several parts of a disjunctive syllogism, or more properly the original and necessary form of these several parts, are given in the following paragraph :

¶ LXIV. 1°. A regular and perfect Disjunctive Syllogism must have three propositions, in which, if the sumption be simple and the disjunction purely logical, only three principal notions can be found.

LXIV. The laws of the Disjunctive Syllogism.

2°. The Sumption, in relation to its quantity and quality, is always uniform, being Universal and Affirmative ; but the Subsumption is susceptible of various forms in both relations.

3°. The Conclusion corresponds in quantity with the subsumption, and is opposed to it in quality.

The first rule is—A regular and perfect disjunctive syllogism must have three propositions, in which, if the sumption be simple, and the disjunction purely logical, only three principal

*Explication.
First Rule.*

notions can be found. Like the categorical syllogism, the disjunctive consists of a sumption, constituting the general rule; of a subsumption, containing its application; and of a conclusion, expressing the judgment inferred. Disjunctive syllogisms are, therefore, true and genuine reasonings; and if in the sumption the disjunction be contradictory, there are in the syllogism only three principal notions. In the case of contrary disjunctions, there may, indeed, appear a greater number of notions; but as such syllogisms are in reality composite, and are made up of a plurality of syllogisms with a contradictory disjunction, this objection to the truth of the rule is as little valid as the circumstance, that the subject in the sumption is sometimes twofold, threefold, fourfold, or manifold; as, for example, in the sumption—*John, James, Thomas, are either virtuous or vicious.* For this is a copulative proposition, which is composed of three simple propositions—viz., *John is,* etc. If, therefore, there be such a sumption at the head of a disjunctive syllogism, it is in this case, likewise, composite, and may be analyzed into as many simple syllogisms with three principal notions, as there are simple propositions into which the sumption may be resolved.

The second rule is—The sumption is, in relation to its quantity and quality, always uniform—being universal and affirmative; but the subsumption is susceptible of different forms in both relations. If we look, indeed, to the subject alone, it may seem to be possibly equally general or particular; for we can equally say of *some* as of *all* A, that they are either B or C. But as all universality is relative, and as the sumption is always more extensive or more comprehensive than the subsumption, it is thus true that the sumption is always general. Again, looking to the predicate, or, as it is complex, to the predicates alone, they, as exclusive of each other, appear to involve a negation. But in looking at the whole proposition, that is, at the subject, copula, and the predicates in connection, we see at once that the copula is affirmative, for the negation involved in the predicates is confined to that term alone.

. Second Rule.

In regard to the third rule, which enounces—That the con-

Third Rule. clusion should have the same quantity with the subsumption, but an opposite quality—it is requisite to say nothing, as the first clause is only a special application of the rule common to all syllogisms, that the conclusion can contain nothing more than the premises, and must, therefore, follow the weaker part; and the second is self-evident, as only a special application of the principle of Excluded Middle, for, on this law, if one contradictory be affirmed in the subsumption, the other must be denied in the conclusion, and if one contradictory be denied in the subsumption, the other must be affirmed in the conclusion.

The Disjunctive, like every other species of syllogism, may

The Disjunctive Syllogism of Comprehension and Extension. be either a reasoning in the quantity of Comprehension, or a reasoning in the quantity of Extension. The contrast, however, of these two quantities is not manifested in the same signal manner in the disjunctive as in the categorical deductive syllogism, more especially of the first figure. In the categorical deductive syllogism, the reasonings in the two counter-quantities are obtrusively distinguished by a complete conversion, not only of the internal significance, but of the external appearance of the syllogism. For not only do the relative terms change places in the relation of whole and part, but the consecution of the antecedents is reversed; the minor premise in the one syllogism becoming the major premise in the other. This, however, is not the case in disjunctive syllogisms. Here the same proposition is, in both quantities, always the major premise; and the whole change that takes place in converting a disjunctive syllogism of the one quantity into a disjunctive syllogism of the other, is in the silent reversal of the copula from one of its meanings to another. This, however, as it determines no apparent difference in single propositions, and as the disjunctive sumption remains always the same proposition, out of which the subsumption and the conclusion are evolved, in the one quantity as in the other—

the reversal of the sumption, from extension to comprehension,

or from comprehension to extension, occasions neither a real nor an apparent change in the syllogism. Take for example, the disjunctive syllogism:

> *Plato is either learned or unlearned;*
> *But Plato is learned;*
> *Therefore, Plato is not unlearned.*

Now let us explicate this into an intensive and into an extensive syllogism. As an Intensive Syllogism it will stand:

Plato comprehends either the attribute learned or the attribute unlearned;
But Plato comprehends the attribute learned;
Therefore, etc.

As an Extensive Syllogism it will stand:

Plato is contained either under the class learned or the class unlearned;
But Plato is contained under the class learned;
Therefore, etc.

From this it appears, that, though the difference of reasoning in the several quantities of comprehension and extension obtains in disjunctive, as in all other syllogisms, it does not, in the disjunctive syllogism, determine the same remarkable change in the external construction and consecution of the parts, which it does in categorical syllogisms.

Having now considered Categorical and Disjunctive Syllogisms, the next class of Reasonings afforded by the difference of Internal or Essential form is the Hypothetical; and the general nature of these syllogisms is expressed in the following paragraph:

¶ LXV. A Hypothetical Syllogism is a reasoning whose form is determined by the law of Reason and

Consequent. It is, therefore, regulated by the two principles of which that law is the complement—the one, With the reason, the

consequent is affirmed; the other, With the consequent, the reason is denied: and these two principles severally afford the condition of its Affirmative or Constructive, and of its Negative or Destructive form (*Modus ponens et Modus tollens*). The sumption or general rule in such a syllogism is necessarily a hypothetical proposition (*If* A *is, then* B *is*). In such a proposition it is merely enounced that the prior member (A) and the posterior member (B) stand to each other in the relation of reason and consequent, if existing, but without its being determined whether they really exist or not. Such determination must follow in the subsumption and conclusion; and that, either by the absolute affirmation of the antecedent in the subsumption, and the illative affirmation of the consequent in the conclusion (the *modus ponens*); or by the absolute negation of the consequent in the subsumption, and the illative negation of the antecedent in the conclusion (the *modus tollens*). The general form of a hypothetical syllogism is, therefore, the following:

Common Sumption—*If* A *is, then* B *is.*

	1.		2.
	MODUS PONENS:		MODUS TOLLENS:
	But A *is;*		*But* B *is not;*
	Therefore, B *is.*		*Therefore,* A *is not.*

Or,

<div align="center">A   B</div>

1). MODUS PONENS—*Si poteris possum; sed tu potes; ergo ego possum.*

<div align="center">B   A</div>

2). MODUS TOLLENS—*Si poteris possum; non possum; nec potes ergo.*

In illustrating this paragraph, I shall consider, 1°. This species of syllogism in general; 2°. Its peculiar principle; and, 3°. Its special laws.

Explication.

1°. Like every other species of simple syllogism, the Hypothetical is made up of three propositions— a

sumption, a subsumption, and a conclusion. There must, in the first place, be a hypothetical proposition holding the place of a general rule, and from this proposition the other parts of the syllogism must be deduced. This first proposition, therefore, contains a sumption. But as this proposition contains a relative and correlative member—one member, the relative clause, enouncing a thing as conditioning ; the other, the correlative clause, enouncing a thing as conditioned ; and as the whole proposition enounces merely the dependency between these relatives, and judges nothing in regard to their existence considered apart and in themselves ; this enouncement must be made in a second proposition, which shall take out of the sumption one or other of its relatives, and categorically enounce its existence or its non-existence. This second proposition contains, therefore, a subsumption ; and, through this subsumption, a judgment is likewise determined, in a third proposition, with regard to the other relative. This last proposition, therefore, contains the conclusion proper of the syllogism.

But as the sumption in a hypothetical syllogism contains two relative clauses—an antecedent and a

consequent—it, therefore, appears double ; and as either of its two members may be taken in the subsumption, there is, consequently, competent a twofold kind of reasoning. For we can either, in the first place, conclude from the truth of the antecedent to the truth of the consequent ; or, in the second place, conclude from the falsehood of the consequent to the falsehood of the antecedent. The former of these modes of hypothetical inference constitutes what is sometimes called the *Constructive Hypothetical*, but more properly the *Modus Ponens :* the latter what is sometimes called the *Destructive Hypothetical*, but more properly the *Modus Tollens.* As examples of the two modes :

Modus Ponens—*If Socrates be virtuous, he merits esteem;*
                But Socrates is virtuous;
                Therefore, he merits esteem.

Modus Tollens—*If Socrates be virtuous, he merits esteem;*
                But Socrates does not merit esteem;
                Therefore, he is not virtuous.

So much for the character of the Hypothetical Syllogism in general. I now proceed to consider its peculiar principle.

2°. If the essential nature of a Hypothetical Syllogism consist in this—that the subsumption affirms or denies one or other of the two parts of a thought, standing to each other in the relation of the thing conditioning and the thing conditioned, it will be the law of a hypothetical syllogism, that—If the condition or antecedent be affirmed, so also must be the conditioned or consequent, and that if the

2°. Its peculiar principle—the law of Reason and Consequent. conditioned or consequent be denied, so likewise must be the condition or antecedent. But this is manifestly nothing else than the law of Sufficient Reason, or of Reason and Consequent. The principle of this syllogism is thus variously enounced—*Posita conditione, ponitur conditionatum; sublato conditionato, tollitur conditio.* Or otherwise:

How enounced. *A ratione ad rationatum, a negatione rationati ad negationem rationis, valet consequentia.* The one alternative of either rule being regulative of *modus ponens,* the other of the *modus tollens.*

But here it may be asked, why, as we conclude from the truth of the antecedent to the truth of the

Why we can not conclude from the truth of the consequent to the truth of the antecedent, and from the falsehood of the antecedent to the falsehood of the consequent. consequent (*a ratione ad rationatum*), and from the falsehood of the consequent to the falsehood of the antecedent (*a negatione rationati ad negationem rationis*), can we not conversely conclude from the truth of the consequent to the truth of the antecedent, and from the falsehood of the antecedent to

the falsehood of the consequent? In answer to this question, it is manifest that this could be validly done, only on the following supposition, namely, if every consequent had only one possible antecedent; and if, from an antecedent false as considered absolutely and in itself, it were impossible to have consequents true as facts.

Thus, in the first place, it is incompetent to conclude that because B exists, that is, because the consequent member of the sumption, considered as an absolute proposition, is true, therefore the supposed reason A exists, that is, therefore the alleged antecedent member must be true; for B may have other reasons besides A, such as C or D. In like manner, in the second place, we should not be warranted to infer, that because the supposed reason A is unreal, and the antecedent member false, therefore the result B is also unreal, and the consequent member false; for the existence of B might be determined by many other reasons than A. For example:

> *If there are sharpers in the company, we ought not to gamble;*
> *But there are no sharpers in the company;*
> *Therefore, we ought to gamble.*

Here the conclusion is as false as if we conversely inferred, that *because we ought not to gamble, there are no sharpers in the room.*

3°. I now go on to a statement and consideration of the special rules by which a hypothetical syllogism is governed.

LXVI. 3°. Special Rules of Hypothetical Syllogism. ¶ LXVI. The special rules by which a Hypothetical Syllogism is regulated are the following:

I. A regular and perfect hypothetical syllogism must have three propositions, in which, however, more than three principal notions may be found.

II. The Sumption is, in regard to quantity and quality, uniform, being always Definite and Affirmative; whereas the Subsumption varies in both relations.

III. The Conclusion is regulated in quantity and quality by that member of the sumption which is not subsumed; *in modo ponente*, they are congruent; *in modo tollente*, they are opposed.

The question touching the special laws of the hypothetical syllogism, or, what is the same thing, the question touching the original and necessary form of the hypothetical syllogism, as determined by its general principle, the law of Reason and its Consequent, this question may be referred both to the whole reasoning and to its several parts. The original and necessary form of the hypothetical syllogism, as determined by its general principle, we have already considered. From this, as already noticed, it follows as a corollary, that the hypothetical must contain a threefold judgment: 1°. A judgment whose constituent members stand to each other in the relation of reason and consequent; 2°. A judgment which subsumes as existent, or non-existent, one or other of these constituent members, standing to each other in the relation of reason and consequent; and, 3°. Finally, a judgment decisive of the existence or non-existence of that constituent member which was not subsumed in the second judgment. In these three propositions—sumption, subsumption, and conclusion—there may, however, be found more than three principal notions; and this is always the case when the sumption contains more than three principal terms, as is exemplified in a proposition like the following: *If God reward virtue, then will virtuous men be also happy*. Here, however, it must, at the same time, be understood, that this proposition, in which a larger plurality of notions than three is apparent, contains, however, only the thought of one antecedent and of one consequent; for a single consequent supposes a whole antecedent, how complex soever it may be, and a single antecedent involves in it a whole consequent, though made up of any number of parts. Both of these possibilities are seen in the

Explication. First Rule. This regulates the general form of the hypothetical syllogism.

example, now adduced, of a hypothetical judgment, in which
there occur more than three principal notions. If, however,
a hypothetical proposition involve only the
thought of a single antecedent and of a sin-
gle consequent, it will follow that any hypo-
thetical syllogism consists not of more than
three, but of less than three, capital notions;
and, in a rigorous sense, this is actually the
case. On this ground, accordingly, some logicians of great
acuteness have viewed the hypothetical syllogism as a syllo-
gism of two terms and of two propositions.

Ground on which the Hypothetical Syllogism has been regarded as having only two terms and two propositions.

The second law states the conditions of these two premises—
that the sumption, in reference to its quan-
tity and quality, is uniform, being always
definite, that is, singular or universal, and affirmative; while
the subsumption, in both relations, remains free.

Second Rule.

In regard to the sumption, when it is said that it is always
definite, that is, singular or universal, and
affirmative, this must be understood in a
qualified sense. Touching the former, it
may indeed be said that quantity may be
altogether thrown out of account in a hypo-
thetical syllogism. For a reason being once supposed, its con-
sequent is necessarily affirmed without limitation; and, by the
disjunction, the extension or comprehension of the subject is so
defined, that the opposite determinations must together wholly
exhaust it. It may, indeed, sometimes appear as if what was
enounced in a hypothetical sumption were enounced only of an
indefinite number—of some; and it, consequently, then assumes
the form of a particular proposition. For instance, *If some men
are virtuous, then some other men are vicious.* But here it is
easily seen that such judgments are of a universal or exhaus-
tive nature. In the proposition adduced, the real antecedent
is, *If some men (only) are virtuous;* the real consequent is,
then all other men are vicious. It would, perhaps, have been
better had the relative totality of the major proposition of a

That the sumption is always definite to be understood in a quali-fied sense.

hypothetical syllogism been expressed by another term than *universal*. For the same reason it is, that the difference of extensive and comprehensive quantity determines no external change in the expression of a hypothetical syllogism ; for every hypothetical syllogism remains the same, whether we read it in the one quantity or in the other.

In regard to the other statement of the rule, that the sump-

That the sumption is always affirmative.

tion of a hypothetical syllogism must be always affirmative—this, likewise, demands a word of illustration. It is true that the antecedent or the consequent of such a sumption may be negative, as well as affirmative ; for example, *If Caius be not virtuous, he is not entitled to respect ; If the sun be not risen, it is not day.* But here the proposition, as a hypothetical judgment, is and must be affirmative. For the affirmative in such a judgment is contained in the positive assertion of the dependence of consequent or antecedent ; and if such a dependence be not affirmed, a hypothetical judgment can not exist.

In regard to what is stated in the rule concerning the condi-

The Subsumption.

tions of the subsumption, that this may either be general or particular, affirmative or negative, it will not be requisite to say anything in illustration. For, as the subsumption is merely an absolute assertion of a single member of the sumption, and as such member may, as an isolated proposition, be of any quantity or any quality, it follows that the subsumption is equally unlimited.

In reference to the third rule, which states that the conclu-

Third Rule.

sion is regulated in quantity and quality by that member of the sumption which is not subsumed, and this *in modo ponente* by congruence, *in modo tollente* by opposition, it will not be requisite to say much.

In the conclusion, the latter clause of the sumption is affirmed *in modo ponente*, because the former is affirmed in the subsumption. In this case, the conclusion has the same quantity and quality as the clause which it affirms. *In modo tollente* the *antecedent* of the sumption is denied in the conclusion, because

in the subsumption the *consequent* clause had been denied. There thus emerges an opposition between that clause, as denied in the conclusion, and that clause as affirmed in the sumption. The conclusion is thus always opposed to the antecedent of the sumption in quantity, or in quality, or in both together, according as this is differently determined by the different constitution of the propositions. For example:

> *If some men were omniscient, then would they be as Gods;*
> *But no man is a God;*
> *Therefore, some men are not omniscient, that is, no man is omniscient.*

I now proceed to the consideration of the last class of syllogisms afforded by the Internal Form—the class of Dilemmatic or Hypothetico-disjunctive Syllogisms, and I comprise a general enunciation of their nature in the following paragraph:

3. Hypothetico-disjunctive or Dilemmatic Syllogisms.

¶ LXVII. If the sumption of a syllogism be at once hypothetical and disjunctive, and if, in the subsumption, the whole disjunction, as a consequent, be sublated, in order to sublate the antecedent in the conclusion; such a reasoning is called a *Hypothetico-disjunctive Syllogism*, or a *Dilemma*. The form of this syllogism is the following:

LXVII. Hypothetico-disjunctive Syllogism or Dilemma.

> *If A exist, then either B or C exists;*
> *But neither B nor C exists;*
> *Therefore, A does not exist.*

We have formerly seen that a hypothetical may be combined with a disjunctive judgment; and if a proposition of such a character be placed at the head of a reasoning, we have the Hypothetico-disjunctive Syllogism or Dilemma. This reasoning is properly a hypothetical

Explication.

syllogism, in which the relation of the antecedent to the conse-
quent is not absolutely affirmed, but affirmed through opposite
and reciprocally exclusive predicates. *If* A *exist, then either*
B *or* C *exist.* The sumption is thus at once hypothetical and
disjunctive. The subsumption then denies the disjunctive
members contained in the consequent or posterior clause of the
sumption. *But neither* B *nor* C *exists.* And then the inference
is drawn in the conclusion, that the reason given in the ante-
cedent or prior clause of the sumption must likewise be denied.
Therefore, A *does not exist.* For example :

> *If man be not a morally responsible being, he must want either the
> power of recognizing moral good (as an intellectual agent), or the
> power of willing it (as a free agent) ;*
> *But man wants neither the power of recognizing moral good (as an
> intelligent agent), nor the power of willing it (as a free agent) ;*
> *Therefore, man is a morally responsible being.*

A hypothetico-disjunctive syllogism is called the *dilemma*
or *horned syllogism* in the broader accepta-

Designations of the Hypothetico-disjunctive Syllogism.
tion of the term (*dilemma, ceratinus, cor-
nutus sc. syllogismus*). We must not, how-
ever, confound the *cornutus* and *crocodilinus*
of the ancients with our hypothetico-disjunctive syllogism.
The former were sophisms of a particular kind, which we are
hereafter to consider ; the latter is a regular and legitimate
form of reasoning. In regard to the application of the terms,
it is called the *cornutus* or *horned syllogism,* because in the
sumption the disjunctive members of the consequent are opposed
like horns to the assertion of the adversary ; with these, we
throw it from one side to the other in the subsumption, in
order to toss it altogether away in the conclusion. If the dis-
junction has only two members, the syllogism is then called a
dilemma (*bicornis*) in the strict and proper signification, lite-
rally *double sumption.* Of this the example previously given
is an instance. If it has three, four, or five members, it is
called *trilemma* (*tricornis*), *tetralemma* (*quadricornis*), *penta-*

lemma (quinquecornis); if more than four, it is, however, usually called *polylemma (multicornis).* But the looser signification of the word, *Dilemma,* is a generic expression for any or all of these.

Considered in itself, the hypothetico-disjunctive syllogism is not to be rejected, for in this form of reason-
ing we can conclude with cogency, provided we attend to the laws already given in regard to the hypothetical and disjunctive syllogisms. It is not, how-ever, to be denied, that this kind of syllogism is very easily abused for the purpose of deceiving, through a treacherous appearance of solidity, and from terrifying a timorous adversary by its horned aspect. In the sifting of a proposed dilemma, we ought, therefore, to look closely at the three following par-ticulars : 1°. Whether a veritable consequence subsists between the antecedent and consequent of the sumption ; 2°. Whether the opposition in the consequent is thorough-going and valid ; and, 3°. Whether in the subsumption the disjunctive members are legitimately sublated. For the example of a dilemma which violates these conditions, take the following :

Rules for sifting a proposed Dilemma.

> *If virtue were a habit worth acquiring, it must insure either power, or*
>   *wealth, or honor, or pleasure;*
> *But virtue insures none of these;*
> *Therefore, virtue is not a habit worth attaining.*

Here : 1°. The inference in general is invalid ; for a thing may be worth acquiring, though it does not secure any of those advantages enumerated. 2°. The disjunction is incomplete ; for there are other goods which virtue insures, though it may not insure those here opposed. 3°. The subsumption is also vicious ; for virtue has frequently obtained for its possessors the very advantages here denied.

Before leaving this subject, it may be proper to make two observations. The first of these is, that though it has been stated that Categorical Syllogisms are governed by the laws of Identity

and Contradiction, that Disjunctive Syllogisms are governed by the law of Excluded Middle, and that Hypothetical Syllogisms are governed by the law of Reason and Consequent—this statement is not, however, to be understood as if, in these several classes of syllogism, no other law were to be found in operation except that by which their peculiar form is determined. Such a supposition would be altogether erroneous, for in all of these different kinds of syllogism, besides the law by which each class is principally regulated, and from which it obtains its distinctive character, all the others contribute, though in a less obtrusive manner, to allow and to necessitate the process. Thus, though the laws of Identity and Contradiction are the laws which preëminently regulate Categorical Syllogisms —still without the laws of Excluded Middle, and Reason and Consequent, all inference in these syllogisms would be impossible. Thus, though the law of Identity affords the basis of all affirmative, and the law of Contradiction the basis of all negative, syllogisms, still it is the law of Excluded Middle which legitimates the implication, that, besides affirmation and negation, there is no other possible quality of predication. In like manner, no inference in categorical reasoning could be drawn, were we to exclude the determination of Reason and Consequent. For we only, in deductive reasoning, conclude of a part what we assume of a whole, inasmuch as we think the whole as the reason—the condition—the antecedent— by which the part, as a consequent, is determined; and we only, in inductive reasoning, conclude of the whole what we assume of all the parts, inasmuch as we think all the parts as the reason—the condition—the antecedent—by which the whole, as a consequent, is determined. In point of fact, logic- ally or formally, the law of Identity and the law of Reason and Consequent in its affirmative form, are at bottom the same; the law of Identity constitutes only the law of

The whole of the logical laws — Identity, Contradiction, Excluded Middle, and Reason and Consequent — are operative in each form of Syllogism.

This illustrated.
1. In Categorical Syllogisms.

The law of Identity formally the same with that of Reason and Consequent.

Reason and Consequent—the two relatives being conceived simultaneously, that is, as subject and predicate; the law of Reason and Consequent constitutes only the law of Identity, the two relatives being conceived in sequence, that is, as antecedent and consequent. And as the law of Reason and Consequent, in its positive form, is only that of Identity in movement; so, in its negative form, it is only that of Contradiction in movement.

In Disjunctive Syllogisms, again, though the law of Excluded Middle be the principle which bestows on 2. In Disjunctive Syllogisms. them their peculiar form, still these syllogisms are not independent of the laws of Identity, of Contradiction, and of Reason and Consequent. The law of Excluded Middle can not be conceived apart from the laws of Identity and Contradiction; these it implies, and, without the principle of Reason and Consequent, no movement from the condition to the conditioned, that is, from the affirmation or negation of one contradictory to the affirmation or negation of the other, would be possible.

Finally, in Hypothetical Syllogisms, though the law of Reason and Consequent be the prominent 3. In Hypothetical Syllogisms. and distinctive principle, still the laws of Identity, Contradiction, and Excluded Middle are also there at work. The law of Identity affords the condition of Affirmative or Constructive, and the law of Contradiction of Negative or Destructive, Hypotheticals; while the law of Excluded Middle limits the reasoning to those two modes alone.

The second observation I have to make, is one suggested by a difficulty which has been proposed to me Difficulty in regard to the doctrine, that all reasoning is either from whole to part, or from the parts to the whole. The difficulty, which could only have presented itself to an acute and observant intellect, it gave me much satisfaction to hear proposed; and I shall have still greater grati-

fication, if I should be able to remove it, by showing in what sense the doctrine advanced is to be understood. It was to this effect: In Categorical Syllogisms, deductive and inductive, intensive and extensive, the reasoning is manifestly from whole to part, or from the parts to the whole, and, therefore, in regard to the doctrine in question, as relative to categorical reasoning, there was no difficulty. But this was not the case in regard to Hypothetical Syllogisms. These are governed by the law of Reason and Consequent, and it does not appear how the antecedent and consequent stand to each other in the relation of whole and part.

In showing how the reason and the consequent are to be viewed as whole and part, it is necessary, first, to repeat, that the reason or antecedent means the *condition*, that is, the complement of all, without which something else would not be; and the consequent means the *conditioned*, that is, the complement of all that is determined to be by the existence of something else. You must further bear in mind, that we have nothing to do with things standing in the relation of reason and consequent, except in so far as they are thought to stand in that relation; it is with the *ratio cognoscendi*, not with the *ratio essendi*, that we have to do in Logic; the former is, in fact, alone properly denominated *reason* and *consequent*, while the latter ought to be distinguished as *cause* and *effect*. The *ratio essendi*, or the law of Cause and Effect, can indeed only be thought under the form of the *ratio cognoscendi*, or of the principle of Reason and Consequent; but as the two are not convertible, inasmuch as the one is far more extensive than the other, it is proper to distinguish them, and, therefore, it is to be recollected, that Logic is alone conversant with the *ratio cognoscendi*, or the law of Reason and Consequent, as alone conversant with the form of thought.

This being understood, if the reason be conceived as that which conditions, in other words, as that which contains the

This difficulty considered with respect to Hypothetical syllogisms.

Antecedent and Consequent are equal to Condition and Conditioned.

necessity of the existence of the consequent; it is evident that it is conceived as containing the consequent.

For, in the first place, reason is only a reason if it be a sufficient reason, that is, if it comprise all the conditions, that is, all that necessitates the existence, of the consequent; for if all the conditions of anything are present, that thing must necessarily exist, since, if it do not exist, then some condition of its existence must have been wanting, that is, there was not a sufficient reason of its existence, which is contrary to the supposition. In the second place, if the reason, the sufficient reason, be conceived as comprising all the conditions of the existence of the consequent, it must be conceived as comprising the consequent together; for if the consequent be supposed to contain in it any one part not conceived as contained in the reason, it may contain two, three, or any number of parts equally uncontained in the reason, consequently it may be conceived as altogether uncontained in the reason. But this is to suppose that it has no reason, or that it is not a consequent; which again is contrary to the hypothesis.

The law of Reason and Consequent, or of the Condition and the Conditioned, is only in fact another expression of Aristotle's law, that the whole is necessarily conceived as prior to the part, *totum parte prius esse, necesse est*. It is, however, more accurate; for Aristotle's law is either inaccurate or ambiguous. Inaccu-

rate, for it is no more true to say that the whole is necessarily prior in the order of thought to the parts, than to say that the parts are necessarily prior in the order of thought to the whole. Whole and parts are relatives, and as such are necessarily

coëxistent in thought. But while each implies the other, and the notion of each necessitates the notion of the other, we may, it is evident, view either, in thought, as the

conditioning or antecedent, or as the conditioned or consequent. Thus on the one hand, we may regard the whole as the prior and the determining. notion, as containing the parts, and the parts as the posterior and determined notion, as contained by the whole. On the other hand, we may regard the parts as the prior and determining notion, as constituting the whole, and the whole as the posterior and determined notion, as constituted by the parts. In the former case, the whole is thought as the reason, the parts are thought as the consequent; in the latter, the parts are thought as the reason, the whole is thought as the consequent. Now, in so far as the whole is thought as the reason, there will be no difficulty in admitting that the reason is conceived as containing the parts. But it may be asked, how can the parts, when thought as the reason, be said to contain the whole? To this the answer is easy. All the parts contain the whole, just as much as the whole contains all the parts. Objectively considered, the whole does not contain all the parts, nor do all the parts contain the whole, for the whole and all the parts are precisely equivalent, absolutely identical. But, subjectively considered, that is, as mere thoughts, we may either think the whole by all the parts, or think all the parts by the whole. If we think all the parts by the whole, we subordinate the notion of the parts to the notion of the whole; that is, we conceive the parts to exist, as we conceive their existence given through the existence of the whole containing them. If we think the whole by all the parts, we subordinate the notion of the whole to the notion of the parts; that is, we conceive the whole to exist, as we conceive its existence given through the existence of the parts which constitute it. Now, in the one case, we think the whole as conditioning or comprising the parts; in the other, the parts as conditioning or comprising the whole. In the former case, the parts are thought to exist, because their whole exists; in the latter, the whole is thought to exist, because its parts exist. In either case, the prior or determining notion is thought to comprise or to contain the posterior or determined. To apply this doctrine:

On the one hand, every science is true only as all its several rules are true; in this instance the science is conceived as the determined notion, that is, as contained in the aggregate of its constituent rules. On the other hand, each rule of any science is true only as the science itself is true; in this instance the rule is conceived as the determined notion, that is, as contained in the whole science. Thus, every single syllogism obtains its logical legitimacy, because it is a consequent of the doctrine of syllogism; the latter is, therefore, the reason of each several syllogism, and the whole science of Logic is abolished, if each several syllogism, conformed to this doctrine, be not valid. On the other hand, the science of Logic, as a whole, is only necessary inasmuch as its complementary doctrines are necessary; and these are only necessary inasmuch as their individual applications are necessary; if Logic, therefore, as a whole, be not necessary, the necessity of the parts, which constitute, determine, and comhend that whole, is subverted. In one relation, therefore, reason and consequent are as the whole and contained part, in another, as all the parts and the constituted or comprised whole. But in both relations, the reason—the determining notion—is thought, as involving in it the existence of the consequent or determined notion. Thus, in one point of view, the genus is the determining notion, or reason, out of which are evolved, as consequents, the species and individual; in another, the individual is the determining notion or reason, out of which, as consequents, are evolved the species and genus. In like manner, if we regard the subject as that in which the attributes inhere—in this view the subject is the reason, that is, the whole, of which the attributes are a part; whereas if we regard the attributes as the modes through which alone the subject can exist, in this view the attributes are the reason, that is, the whole, of which the subject is a part. In a word, whatever we think as conditioned, we think as contained by something else, that is, either as a part, or as a constituted whole; whatever

we think as conditioning, we think either as a containing whole, or as a sum of constituting parts. What, therefore, the sumption of a hypothetical syllogism denotes, is simply this: If A, a notion conceived as conditioning, and, therefore, as involving B, exist, then B also is necessarily conceived to exist, inasmuch as it is conceived as fully conditioned by, or as involved in, A. I am afraid that what I have now said may not be found to have removed the difficulty, but if it suggest to you a train of reflection which may lead you to a solution of the difficulty by your own efforts, it will have done better.

17

SECTION II.—OF THE PRODUCTS OF THOUGHT.

IV.—SYLLOGISMS.

THEIR DIVISIONS ACCORDING TO EXTERNAL FORM.

IN our treatment of Syllogisms, we have hitherto taken note only of the Internal, or Essential Form of Reasoning. But, besides this internal or essential form, there is another, an External or Accidental Form; and as the former was contained in the reciprocal relations of the constituent parts of the syllogism, as determined by the nature of the thinking subject itself, so the latter is contained in the outer expression or enouncement of the same parts, whereby the terms and propositions are variously affected in respect of their number, position, and order of consecution. The varieties of Syllogism arising from their external form may, I think, be conveniently reduced to the three heads expressed in the following paragraph :

Syllogisms—their External Form.

¶ LXVIII. Syllogisms, in respect of their External Form, admit of a threefold modification. For while, as pure, they are at once *Simple*, and *Complete*, and *Regular*, so, as qualified, they are either *Complex*, or *Incomplete*, or *Irregular ;* the two former of these modifications regarding the number of their parts, as apparently either too many or too few ; the last regarding the inverted order in which these parts are enounced.

LXVIII. Division of Syllogisms according to External Form.

I shall consider these several divisions in their order ; and first, of the syllogisms which vary from the simple form of reasoning by their apparent complexity.

Explication.
A. Complex Syllogisms.

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But, before touching on the varieties of syllogism afforded by their apparent complexity of composition, it may be proper to premise a few words in regard to the relation of syllogisms to each other. Every syllogism may be considered as absolute and independent, inasmuch as it always contains a complete and inclusive series of thought. But a syllogism may also stand to other syllogisms in such a relation that, along with these correlative syllogisms, it makes up a greater or lesser series of thoughts, all holding to each other the dependence of antecedent and consequent. And such a reciprocal dependence of syllogisms becomes necessary, when one or other of the predicates of the principal syllogism is destitute of complete certainty, and when this certainty must be established through one or more correlative syllogisms. A syllogism, viewed as an isolated and independent whole, is called a *Monosyllogism* (*monosyllogismus*), that is, a single reasoning; whereas, a series of correlative syllogisms, following each other in the reciprocal relation of antecedent and consequent, is called a *Polysyllogism* (*polysyllogismus*), that is, a multiplex or composite reasoning, and may likewise be denominated a *Chain of Reasoning* (*series syllogistica*). Such a chain—such a series—may, however, have such an order of dependence, that either each successive syllogism is the reason of that which preceded, or the preceding syllogism is the reason of that which follows. In the former case, we conclude analytically or regressively; in the second, synthetically or progressively. That syllogism in the series which contains the reasoning of the premise of another, is called a *Prosyllogism* (*prosyllogismus*); and that syllogism which contains the consequent of another, is called an *Episyllogism* (*episyllogismus*). Every Chain of Reasoning must, therefore, be made up both of Prosyllogisms and of Episyllogisms. When the series is

Relation of Syllogisms to each other.

Classes and designations of related syllogisms. Monosyllogism.

Polysyllogism, or Chain of Reasoning.

This Analytic and Synthetic.

Prosyllogism.

Episyllogism.

composed of more than two syllogisms, the same syllogism may, in different relations, be at once a prosyllogism and an episyllogism; and that reasoning which contains the primary or highest reason is alone exclusively a prosyllogism, as that reasoning which enounces the last or lowest consequent is alone exclusively a episyllogism. But this concatenation of syllogisms, as antecedents and consequents, may be either manifest, or occult, according as the plurality of Syllogisms may either be openly displayed, or as it may appear only as a single syllogism. The polysyllogism is, therefore, likewise either manifest or occult. The occult polysyllogism, with which alone we are at present concerned, consists either of partly complete and partly abbreviated syllogisms, or of syllogisms all equally abbreviated. In the former case, there emerges the complex syllogism called *Epicheirema;* in the latter, the complex syllogism called *Sorites.* Of these in their order.

¶ LXIX. A syllogism is now vulgarly called an *Epicheirema* (ἐπιχείρημα), when to either of the two premises, or to both, there is annexed a reason for its support. As :

LXIX. The Epicheirema.

> B *is* A ; -
> *But* C *is* B; *for it is* D;
> *Therefore,* C *is also* A.

Or,

> *All vice is odious;*
> *But avarice is a vice; for it makes men slaves;*
> *Therefore, avarice is odious.*

In illustration of this paragraph, it is to be observed that the Epicheirema, or Reason-rendering Syllogism, is either single or double, according as one or both of the premises are furnished with an auxiliary reason. The single epicheirema is either an epicheirema of the first or second order, according as the adscititious proposi-

Explication.

tion belongs to the sumption or to the subsumption. There is little or nothing requisite to be stated in regard to this variety of complex syllogism, as it is manifestly nothing more than a regular episyllogism with an abbreviated prosyllogism inter-woven.

¶ LXX. When, on the common principle of all reasoning—that the part of a part is a part of the whole—

LXX. The Sorites.

we do not stop at the second gradation, or at the part of the highest part, and conclude that part of the whole—as *All* B *is a part of the whole* A, *and all* C *is a part of the part* B, *therefore all* C *is also a part of the whole* A—but proceed to some indefinitely remoter part, as D, E, F, G, H, etc., which, on the general principle, we connect in the conclusion with its remotest whole ; this complex reasoning is called a *Chain-Syllogism* or *Sorites*. If the whole from which we descend be a comprehensive quantity, the Sorites is one of Comprehension ; if it be an extensive quantity, the Sorites is one of Extension. The formula of the first will be :

> 1) E *is* D ; that is, E *comprehends* D;
> 2) D *is* C; that is, D *comprehends* C;
> 3) C *is* B; that is, C *comprehends* B;
> 4) B *is* A; that is, B *comprehends* A;
> *Therefore*, E *is* A; in other words, E *comprehends* A.

The formula of the second will be :

> 1) B *is* A; that is, A *contains under it* B;
> 2) C *is* B; that is, B *contains under it* C;
> 3) D *is* C; that is, C *contains under it* D;
> 4) E *is* D; that is, D *contains under it* E;
> *Therefore*, E *is* A; in other words, A *contains under it* E.

These reasonings are both *Progressive*, each in its several quantity, as descending from whole to part. But as we may also, arguing back from part to whole, obtain the same conclu-sion, there is also competent in either quantity a *Regressive*

Sorites. However, the formula of the Regressive Sorites in the one quantity, will be only that of the Progressive Sorites in the other.

As a concrete example of these :

I. PROGRESSIVE COMPREHENSIVE SORITES.

Bucephalus is a horse ;
A horse is a quadruped ;
A quadruped is an animal ;
An animal is a substance ;
Therefore, Bucephalus is a substance.

Or, as explicated :

The representation of the individual Bucephalus comprehends or contains in it the notion horse ;
The notion horse comprehends the notion quadruped ;
The notion quadruped comprehends the notion animal ;
The notion animal comprehends the notion substance ;
Therefore (on the common principle that the part of a part is a part of the whole), the representation of the individual, Bucephalus, comprehends or contains in it the notion substance.

II. REGRESSIVE COMPREHENSIVE SORITES.

An animal is a substance ;
A quadruped is an animal ;
A horse is a quadruped ;
Bucephalus is a horse ;
Therefore, Bucephalus is a substance.

Or, as explicated :

The notion animal comprehends the notion substance ;
The notion quadruped comprehends the notion animal ;
The notion horse comprehends the notion quadruped ;
The representation, Bucephalus, comprehends the notion horse ;
Therefore (on the common principle, etc.), the representation, Bucephalus, comprehends the notion substance.

III. PROGRESSIVE EXTENSIVE SORITES (which is, as enounced by the common copula, identical in expression with the Regressive Comprehensive Sorites, No. II.) :

> *An animal is a substance ;*
> *A quadruped is an animal;*
> *A horse is a quadruped;*
> *Bucephalus is a horse;*
> *Therefore, Bucephalus is a substance.*

Or, as explicated :

The notion animal is contained under the notion substance ;
The notion quadruped is contained under the notion animal ;
The notion horse is contained under the notion quadruped;
The representation Bucephalus is contained under the notion horse ;
Therefore (on the common principle, etc.), the representation Bucephalus
*   is contained under the notion substance.*

IV. THE REGRESSIVE EXTENSIVE SORITES (which is, as expressed by the ambiguous copula, verbally identical with the Progressive Comprehensive Sorites, No. I.):

> *Bucephalus is a horse ;*
> *A horse is a quadruped`;*
> *A quadruped is an animal;*
> *An animal is a substance ;*
> *Therefore, Bucephalus is a substance.*

Or, as explicated :

The representation Bucephalus is contained under the notion horse;
The notion horse is contained under the notion quadruped ;
The notion quadruped is contained under the notion animal ;
The notion animal is contained under the notion substance ;
Therefore, the representation Bucephalus is contained under the notion
*   substance.*

There is thus not the smallest difficulty either in regard to the peculiar nature of the Sorites, or in regard to its relation to the simple syllogism. In the first place, it is evident that the formal inference in the Sorites is equally necessary

1. The formal inference in Sorites equally necessary as in simple syllogism.

and equally manifest as in the simple syllogism, for the principle—the part of a part is a part of the whole—is plainly not less applicable to the remotest than to the most proximate link in the subordination of whole and part. In the second place, it is evident that the Sorites can be resolved into as many simple syllogisms as there are middle terms between the subject and predicate of the conclusion, that is, intermediate wholes and parts between the greatest whole and the smallest part, which the reasoning connects. Thus, the concrete example of a Sorites already given is virtually composed of three simple syllogisms. It will be enough to show this in one of the quantities; and, as the most perspicuous, let us take that of Comprehension.

2. Sorites resolvable into simple Syllogisms.

The Progressive Sorites in this quantity was as follows (and it is needless, I presume, to explicate it):

This Illustrated.

> *Bucephalus is a horse ;*
> *A horse is a quadruped;*
> *A quadruped is an animal ,*
> *An animal is a substance ;*
> *Therefore, Bucephalus is a substance.*

Here, besides the major and minor terms (*Bucephalus* and *substance*), we have three middle terms—*horse*—*quadruped*—*animal*. We shall, consequently, have three simple syllogisms. Thus, in the first place, we obtain from the middle term *horse*, the following syllogism, concluding *quadruped* of *Bucephalus :*

> I.—*Bucephalus is a horse;*
> *But a horse is a quadruped ;*
> *Therefore, Bucephalus is a quadruped.*

Having thus established that *Bucephalus is a quadruped*, we employ *quadruped* as a middle term by which to connect

Bucephalus with *animal.*   We therefore make the conclusion of the previous syllogism (No. I.) the sumption of the following syllogism (No. II.):

> II.—*Bucephalus is a quadruped;*
>   *But a quadruped is an animal;*
>   *Therefore, Bucephalus is an animal.*

Having obtained another step, we in like manner make *animal*, which was the minor term in the preceding syllogism, the middle term of the following; and the conclusion of No. II. forms the major premise of No. III. ·

> III.—*Bucephalus is an animal;*
>   *But an animal is a substance;*
>   *Therefore, Bucephalus is a substance.*

In this last syllogism, we reach a conclusion identical with that of the Sorites.

In the third place, it is evident that the Sorites is equally natural as the simple syllogism; and, as the relation is equally cogent and equally manifest between a whole and a remote, and a whole and a proximate, part, that it is far less prolix, and, consequently, far more convenient.   What is omitted in a Sorites is only the idle repetition of the same self-evident principle, and as this can without danger or inconvenience be adjourned until the end of a series of notions in the dependence of mutual subordination, it is plain that, in reference to such a series, a single Sorites is as much preferable to a number of simple syllogisms, as a comprehensive cipher is preferable to the articulate enumeration of the units which it collectively represents.

3. Sorites equally natural as simple syllogism.

¶ LXXI.   A Sorites may be either Categorical or Hypothetical; and, in both forms, it is governed by the following laws: Speaking of the Common or Progressive Sorites (in which

LXXI. Sorites—Categorical and Hypothetical.

and equally manifest as in the simple syllogism, for the principle—the part of a part is a part of the whole—is plainly not less applicable to the remotest than to the most proximate link in the subordination of whole and part. In the second place, it is evident that the Sorites can be resolved into as many simple syllogisms as there are middle terms between the subject and predicate of the conclusion, that is, intermediate wholes and parts between the greatest whole and the smallest part, which the reasoning connects. Thus, the concrete example of a Sorites already given is virtually composed of three simple syllogisms. It will be enough to show this in one of the quantities; and, as the most perspicuous, let us take that of Comprehension.

2. Sorites resolvable into simple Syllogisms.

The Progressive Sorites in this quantity was as follows (and it is needless, I presume, to explicate it):

This Illustrated.

> *Bucephalus is a horse;*
> *A horse is a quadruped;*
> *A quadruped is an animal,*
> *An animal is a substance;*
> *Therefore, Bucephalus is a substance.*

Here, besides the major and minor terms (*Bucephalus* and *substance*), we have three middle terms—*horse*—*quadruped*—*animal*. We shall, consequently, have three syllogisms. Thus, in the first place, we obtain from term *horse*, the following syllogism, concluding *Bucephalus*:

> I.—*Bucephalus is a horse;*
> *But a horse is a quadruped;*
> *Therefore, Bucephalus is a quadruped*

Having thus established
we employ *quadruped*

Bucephalus with …… ……… …… …… ……
the previous …… …… …… …… …… ……
syllogism No. I :

> I.—………… …… ………
> … ………… … …… ……
> …… …… ………… … ……

Having ……… …… …… …… …… …… ……
mal, …… …… …… …… …… …… ……
middle term of the …… …… …… ……
forms the major premise …… ……

> III.—………… … … ……
> … … …… … … ……
> …… …… …… …… ……

In this last syllogism …… …… …… ……
that of the Sorites.

In the third place …… …… …… …… ……
…… …… …… …… …… ……
1. Sorites equally …… …… …… …… ……
natural as simple syl-
logism.   …… …… …… ……
…… …… …… ……
less prolix, and consequently …… …… ……
omitted in a Sorites …… …… …… …… …… ……   …m ;
evident principle, …… …… …… …… … sec-
be adjourned until the …… …… …… first,
ence of mutual …… …… …… ……
a series, a single …… …… …… ……
simple syllogism, …… …… …… ……
the arbitrary …… …… ……
represents.   *unhappy.*

…… ……   sumption of the
…… sion of the preced-

reasoning you will observe the meaning of the word *progressive* is reversed), which proceeds from the individual to the general, and to which the other form may be easily reduced: 1°. The number of the premises is unlimited. 2°. All the premises, with exception of the last, must be affirmative, and, with exception of the first, definite. 3°. The first premise may be definite or indefinite. 4°. The last may be either negative or affirmative.

I have already given you examples of the categorical Sorites. The following is the formula of the hypothetical:

Explication.

Formula of Hypothetical Sorites.

PROGRESSIVE.	REGRESSIVE.
If D *is,* C *is;*	*If* B *is,* A *is;*
If C *is,* B *is;*	*If* C *is,* B *is;*
If B *is,* A *is;*	*If* D *is,* C *is;*
(In modo ponente),	(In modo ponente),
Now D *is;*	*Now* D *is;*
Therefore, A *is also.*	*Therefore,* A *is.*
(Or in modo tollente),	(Or in modo tollente),
Now A *is not;*	*Now* A *is not;*
Therefore, D *is not.*	*Therefore,* D *is not.*

Or, to take a concrete example:

PROGRESSIVE.

If Harpagon be avaricious, he is intent on gain;
If intent on gain, he is discontented;
If discontented, he is unhappy;
Now Harpagon is avaricious;
He is, therefore, unhappy.

REGRESSIVE.

If Harpagon be discontented, he is unhappy;
If intent on gain, he is discontented;
If avaricious, he is intent on gain;
Now Harpagon is avaricious;
Therefore, he is unhappy.

In regard to the resolution of the Hypothetical Sorites into simple syllogisms, it is evident that in this Progressive Sorites we must take the two first propositions as premises, and then in the conclusion connect the antecedent of the former proposition with the consequent of the latter. Thus :

Resolution of Hypothetical Sorites into simple syllogisms.

I. Progressive Sorites.

> I.—*If Harpagon be avaricious, he is intent on gain ;*
> *If intent on gain, he is discontented ;*
> *Therefore, if Harpagon be avaricious, he is discontented.*

We now establish this conclusion, as the sumption of the following syllogism :

> II.—*If Harpagon be avaricious, he is discontented ;*
> *If discontented, he is unhappy ;*
> *Therefore, if Harpagon be avaricious, he is unhappy.*

In like manner we go to the next syllogism :

> III.—*If Harpagon be avaricious, he is unhappy ;*
> *Now Harpagon is avaricious ;*
> *Therefore, he is unhappy.*

In the Regressive Sorites, we proceed in the same fashion ; only that, as here the consequent of the second proposition is the antecedent of the first, we reverse the consecution of these premises. Thus :

II. Regressive Sorites.

> I.—*If Harpagon be intent on gain, he is discontented ;*
> *If discontented, he is unhappy ;*
> *Therefore, if Harpagon be intent on gain, he is unhappy.*

We then take the third proposition for the sumption of the next—the second syllogism, and the conclusion of the preceding for its subsumption :

> II.—*If Harpagon be avaricious, he is intent on gain;*
> *If intent on gain, he is unhappy;*
> *Therefore, if Harpagon be avaricious, he is unhappy.*

We now take this last conclusion for the sumption of the last syllogism:

> III.—*If Harpagon be avaricious, he is unhappy;*
> *Now Harpagon is avaricious;*
> *Therefore, he is unhappy.*

But it may be asked, can there be no Disjunctive Sorites?
Disjunctive Sorites. To this it may be answered, that in the sense in which a categorical and hypothetical syllogism is possible—viz., so that a term of the preceding proposition should be the subject or predicate of the following—in this sense, a disjunctive sorites is impossible: since two opposing notions, whether as contraries or contradictories, exclude each other, and can not, therefore, be combined as subject and predicate. But when the object has been determined by two opposite characters, the disjunct members may be amplified at pleasure, and there follows certainly a correct conclusion, provided that the disjunction be logically accurate. As:

<div align="center">

A is either B or C.

Now,

</div>

B is either D *or* E;	*C is either* F *or* G;
D is either H *or* I;	*F is either* M *or* N;
E is either K *or* L.	*G is either* O *or* P.

Therefore, A is either H, *or* I, *or* K, *or* L, *or* M, *or* N, *or* O, *or* P.

Although, therefore, it be true that such a Sorites is correct; still, were we astricted to such a mode of
Complex and unserviceable. reasoning, thought would be so difficult as to be almost impossible. But we never are obliged to employ such a reasoning; for when we are once assured that A *is either* B *or* C—and assured we are of this by

one of the fundamental laws of thought—we have next to con-
sider whether A is B or C, and if A is B, then all that can be
said of C, and if A is C, then all that can be said of B, is dis-
missed as wholly irrelevant. In like manner, in the case of B,
it must be determined whether it is D or E, and in the case of
C, whether it is F or G; and this being determined, one of the
two members is necessarily thrown out of account. And this
compendious method we follow in the process of thought spon-
taneously, and as if by a natural impulsion.

    I proceed now to the Second Class of Syllogisms—those,
to wit, whose External Form is defective.

**B. Syllogisms defec-
tive in External Form.** This class I give in conformity to the doc-
trine of modern logicians, whose unanimous
opinion on the subject I shall comprehend in the following
paragraph.

    ¶ LXXII. According to logicians, in general, a defective
syllogism is a reasoning in which one only

**LXXII. The Enthy-
meme.** of the premises is actually enounced. It is,
therefore, they say, called an *Enthymeme*
(ἐνθύμημα), because there is, as it were, something held back
in the mind (ἐν θυμῷ). But, as it is possible to retain either
the sumption or the subsumption, the Enthymeme is thus of
two kinds—an Enthymeme of the First, and an Enthymeme of
the Second, Order. The whole distinction is, however, erro-
neous in principle, and, even if not erroneous, it is incom-
plete; for a Third Order of Enthymemes is competent by the
suppression of the conclusion.

    I now go on to the Third Division of Syllogisms, under the
head of their External or Accidental form—

**C. Syllogism, Regu-
lar and Irregular.** I mean the division of syllogisms into Regu-
lar and Irregular—a distinction determined
by the ordinary or extraordinary arrangement of their constit-
uent parts. I commence this subject with the following para-
graph.

¶ LXXIII. A syllogism is Irregular by relation : 1°. To the transposed order of its Propositions ; 2°.

To the transposed order of its Terms ; and, 3°. To the transposed order of both its Propositions and Terms.

1°. A syllogism in extension is Regular, in the order of its Propositions, when the subsumption follows the sumption, and the conclusion follows the subsumption. In this respect (discounting the difference of the quantities of depth and breadth), it, therefore, admits of a fivefold irregularity under three heads —for either, 1°. The two premises may be transposed ; or, 2°. The conclusion may precede the premises, and here, either the sumption or the subsumption may stand first ; or, 3°. The conclusion may be placed between the premises, and here either the sumption or the subsumption may stand first. Thus, representing the sumption, subsumption, and conclusion by the letters A, B, C, we have, besides the regular order, 1°. B, A, C ; 2°. C, A, B ; 3°. C, B, A ; 4°. A, C, B ; 5°. B, C, A. (This doctrine of the logicians is, however, one-sided and erroneous.)

2°. A Syllogism is Regular or Irregular, in respect to the order of its Terms, according to the place which the middle term holds in the premises. It is regular, in Comprehensive Quantity, when the middle term is the predicate of the sumption and the subject of the subsumption—in Extensive Quantity, when the middle term is the subject of the sumption and the predicate of the subsumption. From the regular order of the terms there are three possible deviations, in either quantity. For the middle term may occur, 1°. Twice as predicate ; 2°. Twice as subject ; and, 3°. In Comprehensive Quantity, it may in the sumption be subject, and in the subsumption predicate ; in Extensive Quantity, it may in the sumption be predicate, and in the subsumption subject. Taking the letter M to designate the middle term, and the letters S and P to designate the subject and predicate of the conclusion, the following scheme will represent all the possible positions of the middle term, both in its regular and its irregular arrangement. The Regular

constitutes the First Figure; the Irregular order the other Three.

A—In Comprehension.

I.	II.	III.	IV.
S *is* M.	S *is* M.	M *is* S.	M *is* S.
M *is* P.	P *is* M.	M *is* P.	P *is* M.
S *is* P.	S *is* P.	S *is* P.	S *is* P.

B—In Extension.

I.	II.	III.	IV.
M *is* P.	P *is* M.	M *is* P.	P *is* M.
S *is* M.	S *is* M.	M *is* S.	M *is* S.
S *is* P.	S *is* P.	S *is* P.	S *is* P.

These relative positions of the middle term in the premises, constitute, I repeat, what are called the *Four Syllogistic Figures* (σχήματα, *figuræ*); and these positions I have comprised in the two following mnemonic lines:

In Comprehension.

Præ sub; tum præ præ; denique sub præ.

In Extension.

Sub præ; tum præ præ; tum sub sub; denique præ sub.

Of these two kinds of irregularity in the external form of syllogisms, the former—that of propositions —is of far less importance than the latter— that of terms; and logicians have even thrown it altogether out of account, in their consideration of Syllogistic Figure. They are, however, equally wrong in passing over the

Explication.
Irregularity in the external form of syllogism, arising from transposition of the Propositions.

irregular consecution of the propositions of a syllogism, as a
matter of absolutely no moment; and in at-
tributing an exaggerated importance to every
variety in the arrangement of its terms.
They ought at least to have made the student
of Logic aware, that a syllogism can be per-
spicuously expressed not only by the normal,
but by any of the five consecutions of its propositions which
deviate from the regular order.   For example, take the follow-
ing syllogism:

That a syllogism can be perspicuously expressed by any of the five irregular consecutions of its Propositions.

> *All virtue is praiseworthy ;*
> *But sobriety is a virtue ;*
> *Therefore, sobriety is praiseworthy.*

This is the regular succession of sumption, subsumption, and
conclusion, in a syllogism of extension; and as all that can be
said, on the present question, of the one quantity, is applicable,
mutatis mutandis, to the other, it will ·be needless to show
articulately that a syllogism in comprehension is equally sus-
ceptible of a transposition of its propositions as a syllogism in
extension.   Keeping the same quantity, to wit, extension, let
us first reverse the premises, leaving the conclusion in the last
place (B, A, C).

> *Sobriety is a virtue ;*
> *But all virtue is praiseworthy ;*
> *Therefore, sobriety is praiseworthy.*

This, it will be allowed, is sufficiently perspicuous.   Let us
now enounce the conclusion before the premises; and, under
this head, let the premises be first taken in their natural 'order
(C, A, B).

> *Sobriety is praiseworthy ;*
> *For all virtue is praiseworthy ;*
> *And sobriety is a virtue.*

Now let the premises be transposed (C, B, A).

> *Sobriety is praiseworthy ;*
> *For sobriety is a virtue ;*
> *And all virtue is praiseworthy.*

The regressive reasoning in both these cases is not less manifest than the progressive reasoning of the regular order.

In the last place, let us interpolate the conclusion between the premises in their normal consecution (A, C, B).

> *All virtue is praiseworthy ;*
> *Therefore, sobriety is praiseworthy ;*
> *For sobriety is a virtue.*

Secondly, between the premises in their reversed order (B, C, A).

> *Sobriety is a virtue ;*
> *Therefore, sobriety is praiseworthy ;*
> *For all virtue is praiseworthy.*

In these two cases the reasoning is not obscure, though perhaps the expression be inelegant ; for the judgment placed after the conclusion had probably been already supplied in thought on the enunciation of the conclusion, and, therefore, when subsequently expressed, it is felt as superfluous. But this is a circumstance of no logical importance.

It is thus manifest, that, though worthy of notice in a system of Logic, the transposition of the propositions of a syllogism affords no modifications of form yielding more than a superficial character. Logicians, therefore, were not wrong in excluding the order of the propositions as a ground on which to constitute a difference of syllogistic form : but they have not been consistent, or not sufficiently sharp-sighted, in this exclu-

sion ; for several of their recognized varieties of form—several of the moods of syllogistic figure—consist in nothing but a reversal of the premises.

In reality, however, there is no irregular order of the syllogistic propositions, except in the single case where the conclusion is placed between the premises. For a syllogism may be either called *Synthetic*, in case the premises come first, and the conclusion is last—the case alone contemplated by the logicians ; or it may be called *Analytic*, the proposition styled the conclusion preceding, the propositions called the premises following, as its reasons—a case not contemplated by the logicians. The Analytic and Synthetic syllogisms may again be each considered as in the quantity of Extension, or as in the quantity of Comprehension ; in which cases, we shall have a counter-order of the premises, but of which orders, as indeed of such quantities, one alone has been considered by the logicians.

True doctrine of consecution.

Syllogism either Synthetic or Analytic.

I now, therefore, go on to the second and more important ground of regularity and irregularity—the natural and transposed order of the Syllogistic Terms. The forms determined by the different position of the middle term by relation to the major and minor terms in the premises of a syllogism are called *Figures* (σχήματα, *figuræ*)— a name given to them by Aristotle.   Of these the first is, on the prevalent doctrine, not properly a figure at all, if by figure be meant in Logic, as in Grammar and Rhetoric, a deviation from the natural and regular form of expression.   Of these figures the first three were distinguished by Aristotle, who developed their rules with a tedious minuteness sometimes obscure, and not always in the best order, but altogether with an acuteness which, if ever equaled, has certainly

The natural and transposed order of the Syllogistic Terms.

Figures of Syllogism.

Three figures distinguished by Aristotle.

never been surpassed. The fourth, which Whately—at least
in the former editions of his *Elements*—and
other Oxford logicians seem to suppose to
be, like the others, of Aristotelic origin, we
owe perhaps to the ingenuity of Galen.

Fourth Figure attrib- *
uted to Galen, but on
slender authority.

¶ LXXIV. The figure of Syllogism is modified by the
Quantity and Quality of the propositions
which constitute the reasoning. As the com-
bination of Quantity and Quality affords four
kinds of propositions—Universal Affirmative (A), Universal
Negative (E), Particular Affirmative (I), Particular Negative
(O); and as there are three propositions in each syllogism,
there are consequently in all sixty-four arrangements possible of
three propositions, differing in quantity and quality; arrange-
ments which constitute what are called the *Syllogistic Moods*
(τρόποι, *modi*). I may interpolate the observation: The
Greek logicians after Aristotle, looking merely to the two
premises in combination, called these *Syzygies* (συζυγίαι, *juga-
tiones, conjugationes, combinationes*). Aristotle himself never
used τρόπος for either mood or modality specially; nor does
he use συζυγία in any definite sense. His only word for mood
is the vague expression *syllogism*.

LXXIV. Syllogistic
Moods.

The greater number of these moods are, however, incompe-
tent, as contradictory of the general rules of syllogism; and
there are in all only eleven which can possibly enter a legiti-
mate syllogism. These eleven moods again are, for the same
reason, not all admissible in every figure, but six only in each,
that is, in all twenty-four; and again of these twenty-four,
five are useless, and, therefore, usually neglected, as having a
particular conclusion where a universal is competent. The
nineteen useful moods admitted by logicians may, however, by
the quantification of the predicate, be still further simplified, by
superseding the significance of Figure.

¶ LXXV. The three last (that is, Second, Third, Fourth) Figures are merely hybrid or mixed reasonings, in which the steps of the process are only partially expressed. The unexpressed steps are, in general, conversive inferences, which we are entitled to make, 1°. From the absolute negation of a first notion as predicated of a second, to the absolute negation of the second notion as predicated of the first—*if no* A *is* B; *then no* B *is* A; 2°. From the total or partial affirmation of the lesser class or notion of a greater, to the partial affirmation of that greater notion of that lesser—*if all* (or *some*) A *is* B; *then some* B *is* A.

SECTION II.—OF THE PRODUCTS OF THOUGHT.

III.—SYLLOGISMS.

THEIR DIVISIONS ACCORDING TO VALIDITY.

ALL the varieties of Syllogism, whose necessary laws and contingent modifications we have hitherto considered, are, taken together, divided into classes by reference to their Validity; and I shall comprise the heads of what I shall afterward illustrate, in the following paragraph.

¶ LXXVI. Syllogisms, by another distribution, are distinguished, by respect to their Validity, into *Correct* or *True*, and *Incorrect* or *False*. The Incorrect or False are again (though not in a logical point of view) divided, by reference to the intention of the reasoner, into *Paralogisms, Faulty*, and into *Sophisms*, or *Deceptive, Reasonings*. The Paralogism (*paralogismus*) is properly a syllogism of whose falsehood the employer is not himself conscious; the Sophism (*sophisma, captio, cavillatio*) is properly a false syllogism, fabricated and employed for the purpose of deceiving others. The term *Fallacy* may be applied indifferently in either sense. These distinctions are, however, frequently confounded; nor in a logical relation are they of account. False Syllogisms are, again, vicious, either in respect of their form or of their matter, or in respect of both form and matter.

LXXVI. Syllogisms—Correct and Incorrect.

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In regard to the first distinction contained in this paragraph, of Syllogisms into Correct or True and Incorrect or False, it is requisite to say a few words. It is necessary to distinguish logical truth, that is, the truth which Logic guarantees in a reasoning, from the absolute truth of the several

Explication.
Logical and absolute truth discriminated.

judgments of which a reasoning is composed.   I have fre-
quently inculcated on you that Logic does not warrant the
truth of its premises, except in so far as these may be the
formal conclusions of anterior reasonings ; it only warrants (on
the hypothesis that the premises are truly assumed) the truth
of the inference.   In this view the conclusion may as a sepa-
rate proposition, be true, but if this truth be not a necessary
consequence from the premises, it is a false conclusion, that is,
in fact, no conclusion at all.   Now, on this point there is a
doctrine prevalent among logicians, which is not only errone-
ous, but, if admitted, is subversive of the distinction of Logic
as a purely formal science.   The doctrine in question is in its
result this—that if the conclusion of a syllogism be true, the
premises may be either true or false, but that if the conclusion
be false, one or both of the premises must be false ; in other
words, that it is possible to infer true from false, but not false
from true.   As an example of this, I have seen given the fol-
lowing syllogism :

> *Aristotle is a Roman ;*
> *A Roman is a European ;*
> *Therefore, Aristotle is a European.*

The inference, in so far as expressed, is true ; but I would
remark that the whole inference which the premises necessi-
tate, and which the conclusion, therefore, virtually contains, is
not true—is false.   For the premises of the preceding syllo-
gism gave not only the conclusion, *Aristotle is a European*, but
also the conclusion, *Aristotle is not a Greek;* for it not merely
follows from the premises that Aristotle is conceived under the
universal notion of which the concept *Roman* forms a particu-
lar sphere, but likewise that he is conceived as excluded from
all the other particular spheres which are contained under that
universal notion.   The consideration of the truth of the
premise, *Aristotle is a Roman*, is, however, more properly to be
regarded as extralogical ; but if so, then the consideration of
the conclusion, *Aristotle is a European*, on any other view than

a mere formal inference from certain given antecedents, is, likewise, extralogical. Logic is only concerned with the formal truth—the technical validity—of its syllogisms, and anything beyond the legitimacy of the consequence it draws from certain hypothetical antecedents, it does not profess to vindicate. Logical truth and falsehood are thus contained in the correctness and incorrectness of logical inference; and it was, therefore, with no impropriety that we made a true or correct, and a false or incorrect syllogism convertible expressions.

In regard to the distinction of Incorrect Syllogisms into Paralogisms and Sophisms, nothing need be said. The mere statement is sufficiently manifest; and, at the same time, it is not of a logical import. For logic does not regard the intention with which reasonings are employed, but considers exclusively their internal legitimacy. But while the distinction is one, in other respects, proper to be noticed, it must be owned that it is not altogether without a logical value. For it behooves us to discriminate those artificial sophisms, the criticism of which requires a certain acquaintance with logical forms,. and which, as a play of ingenuity and an exercise of acuteness, are not without their interest, from those paralogisms which, though not so artificial, are on that account only the more frequent causes of error and delusion.

The distinction of Incorrect Syllogisms into Paralogisms and Sophisms, not of logical import.

The last distinction is, however, logically more important, viz.: 1°. Of reasonings into such as are materially fallacious, that is, through the object-matter of their propositions; 2°. Into such as are formally fallacious, that is, through the manner or form in which these propositions are connected; and, 3°. Into such as are at once materially and formally fallacious. Material Fallacies lie beyond the jurisdiction of Logic. Formal Fallacies can only be judged of by an application of those rules, in the exposition of which we have hitherto been engaged.

Formal and material Fallacies.

The application of these rules will afford the opportunity of adducing and resolving some of the more capital of those Sophisms, which owe their origin to the ingenuity of the ancient Greeks. Many of these sophisms appear to us in the light of a mere play of wit and acuteness, and we are left to marvel at the interest which they originally excited—at the celebrity which they obtained, and at the importance attached to them by some of the most distinguished thinkers of antiquity. The marvel will, however, be in some degree abated, if we take the following circumstances into consideration.

Ancient Greek Sophisms.

In the first place, in the earlier ages of Greece, the method of science was in its infancy, and the laws of thought were not yet investigated with the accuracy and minuteness requisite to render the detection of these fallacies a very easy matter. Howbeit, therefore, men had an obscure consciousness of their fallacy, they could not at once point out the place in which the error lay; they were thus taken aback, confounded, and constrained to silence.

In the second place, the treatment of scientific subjects was more oral and social than with us; and the form of instruction principally that of dialogue and conversation. In antiquity, men did not isolate themselves so much in the retirement of their homes; and they read far less than is now necessary in the modern world; consequently, with those who had a taste for science, the necessity of social communication was greater and more urgent. In their converse on matters of scientific interest, acuteness and profundity were, perhaps, less conducive to distinction than vivacity, wit, dexterity in questioning, and in the discovery of objections, self-possession, and a confident and uncompromising defense of bold, half-true, or even erroneous assertions. Through such means, a very superficial intellect can frequently, even with us, puzzle and put to silence another far acuter and more profound. But, among the Greeks, the Sophists and Megaric philosophers were accomplished masters in these arts.

In the third place, as we know from Aristotle and Diogenes Laertius, it was the rule in their dialogical disputations, that every question behooved to be answered by a yes or a no, and thus the interrogator had it in his power to constrain his adversary always to move in a foreseen, and, consequently, a determinate direction. Thus the Sophisms were somewhat similar to a game of forfeits, or like the passes of a conjurer, which amuse and astonish for a little, but the marvel of which vanishes the moment we understand the principle on which they are performed.

As the various fallacies arise from secret violation of the logical laws by which the different classes of syllogisms are governed, and as syllogisms are Categorical, or Hypothetical, or Disjunctive, or Hypothetico-disjunctive, we may properly consider Fallacies under these four heads, and as transgressions of the syllogistic laws in their special application to these several kinds of syllogism.

¶ LXXVII. The Syllogistic Laws determine, in reference to all the classes of Syllogism, the three following principles; and all Fallacies are violations of one or other of these principles, in relation to one or other class of syllogism.

LXXVII. Fallacies —their division and classification.

I. If both the Logical Form and the Matter of a syllogism be correct, then is the Conclusion true.

II. If the syllogism be Materially Correct, but Formally Incorrect, then the Conclusion is not (or only accidentally) true.

III. If the syllogism be Formally Correct, but Materially Incorrect, then the Conclusion is not (or only accidentally) true.

Fallacies, as violations of these principles in more immediate reference to one or other of the Four Classes of Syllogism, must again be vicious in reference either to the form, or to the matter, or to both the form and matter of a syllogism. Fallacies are thus again divided into *Formal* and *Material*, under which classes we shall primarily arrange them.

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¶ LXXVIII. Of Formal Fallacies, the Categorical are the most frequent, and of these, those whose vice lies in having four in place of three terms (*quaternione terminorum*); for this, in consequence of the ambiguity of its expression, does not immediately betray itself. Under this genus are comprised three species, which are severally known under the names of, 1°. *Fallacia sensus compositi et divisi;* 2°. *Fallacia a dicto secundum quid ad dictum simpliciter, et vice versa;* 3°. *Fallacia figuræ dictionis.*

LXXVIII. Formal Fallacies Categorical.

That in a categorical syllogism only three terms are admissible, has been already shown. A categorical syllogism, with four capital notions, has no connection; and is called, by way of jest, the *logical quadruped* (*animal quadrupes logicum*). This vice usually occurs when the notions are in reality different, but when their difference ·is cloaked by the verbal identity of the terms; for, otherwise, it would be too transparent to deceive either the reasoner himself or any one else. This vice may, however, be of various kinds, and of these there are, as stated, three principal species.

Explication. Fallacies arising from a Quaternio Terminorum.

The first is the *Fallacia sensus compositi et divisi*—the *Fallacy of Composition and Division.* This arises when, in the same syllogism, we employ words now collectively, now distributively, so that what is true in connection, we infer must be also true in separation, and *vice versa;* as, for example: *All must sin; Caius sins; therefore, Caius must sin.* Here we argue, from the unavoidable liability in man to sin, that this particular sin is necessary, and for this individual sinner. This fallacy may arise in different ways. 1°. It may arise when the predicate is joined with the subject in a simple and in a modal relation, for example: *White can be (i. e. become) black; therefore, white can be black.* 2°. It may arise from the confusion

1. Fallacia sensus compositi et divisi.

Modes of this Fallacy.

of a copulative and disjunctive combination. Thus: 9 *consis!s or is made up of* 7+2, *which are odd and even numbers; therefore,* 9 *is odd and even.* 3°. It may arise, if words connected in the premises are disjoined in the conclusion. Thus: *Socrates is dead; therefore, Socrates is.*

An example of the first of these contingencies—that which is the most frequent and dangerous—occurs when, from its universality, a proposition must be interpreted with restriction. Thus, when our Saviour says, *The blind shall see—The deaf shall hear,* he does not mean that the blind, as blind, shall see—that the deaf, as deaf, shall hear; but only that those who had been blind and deaf should recover the use of these senses. To argue the opposite would be to incur the fallacy in question.

The second fallacy is that *A dicto secundum quid ad dictum simpliciter,* and its converse, *A dicto simpli-*

2. *Fallacia a dicto secundum quid ad dictum simpliciter,* and its converse.

citer ad dictum secundum quid. The former of these—the fallacy *A dicto secundum quid ad dictum simpliciter*—arises when, from what is true only under certain modifications and relations, we infer it to be true absolutely. Thus, if, from the fact that some Catholics hold the infallibility of the Pope, we should conclude that the infallibility of the Pope is a tenet of the Catholic Church in general. The latter—the fallacy *A dicto simpliciter ad dictum secundum quid*—is the opposite sophism, where from what is true absolutely we conclude what is true only in certain modifications and relations, as, for example, when from the premise that *Man is a living organism,* we infer that *A painted or sculptured man is a living organism.*

The third fallacy—the *Sophisma figuræ dictionis*—arises when we merely play with the ambiguity of a word. The well-known syllogism, *Mus syllaba est; Mus caseum rodit; Ergo, syllaba caseum rodit,* is an example; or,

> *Herod is a fox;*
> *A fox is a quadruped;*
> *Therefore, Herod is a quadruped.*

To this fallacy may be reduced what are called the *Sophisma equivocationis*, the *Sophisma amphiboliæ*, and the *Sophisma accentus*, which are only contemptible modifications of this contemptible fallacy.

¶ LXXIX. Of Material Fallacies, those are of the most frequent occurrence, where, from a premise which is not in reality universal, we conclude universally; or from a notion which is not in reality a middle term, we infer a conclusion. Under this genus there are various species of fallacies, of which the most remarkable are, 1°. the *Sophisma cum hoc (vel post hoc), ergo propter hoc;* 2°. *Sophisma pigrum*, or *ignava ratio;* 3°. *Sophisma polyzeteseos;* and 4°, *Sophisma heterozeteseos.*

LXXIX.   Material Fallacies.

In this paragraph you will observe that there are given two genera of Material Fallacies—those of an Unreal Universality (*sophismata fictæ universalitatis*), and those of an Illusive Reason (*sophismata falsi medii*—or *non causæ ut causæ*). I must first explain the nature of these, considered apart, then show that they both fall together, the one being only the categorical, the other only the hypothetical, expression of the same vice; and, finally, consider the various species into which the generic fallacy is subdivided.

Explication. Fallicies of an Unreal Universality, and of an Illusive Reason.

Our decisions concerning individual objects, in so far as they belong to certain classes, are very frequently fallacies of the former kind; that is, conclusions from premises of an unreal universality. For example: *The Jews are rogues—The Carthaginians, faithless—The Cretans, liars—The French, bragadocios—The Germans, mystic—The rich, purse-proud—The noble, haughty—Women, frivolous—The learned, pedants.* These and similar judgments, which in general are true only of many—at best only of the majority, of the subjects of a class, often constitute, however, the grounds of the opinions we form of indi-

1. Of an Unreal Universality.

viduals; so that these opinions, with their grounds, when expressed as conclusion and premises, are nothing else than fallacies of an unreal generality—*sophismata fictæ universalitatis*. It is impossible, however, to decide by logical rules whether a proposition, such as those above stated, is or is not universally valid; in this, experience alone can instruct us. Logic requires only, in general, that every sumption should be universally valid, and leaves it to the several sciences to pronounce whether this or that particular sumption does or does not fulfill this indispensable condition. The *sophisma fictæ universalitatis* is thus a fallacious syllogism of the class of categoricals.

But the second kind of material fallacies, the sophisms of Unreal Middle, are not less frequent than those of unreal universality. When, for

2. Of Unreal Middle.

example, it is argued (as was done by ancient philosophers) that the magnet is animated, because it moves another body, or that the stars are animated, because they move themselves; here there is assumed not a true, but merely an apparent, reason; there is, consequently, no real mediation, and the *sophisma falsi medii* is committed. For, in these cases, the conclusion in the one depends on the sumption—*If a body moves another body, it is animated;* in the other, on the sumption—*If a body moves itself, it is animated;* but as the antecedent and consequent in neither of these sumptions are really connected as reason and consequent—or as cause and effect—there is, therefore, no inference of the conclusion. The *sophisma*

The fallacies of Unreal Reason and of Unreal Universality coincide.

non causæ ut causæ is thus a hypothetical syllogism; but, as it may be categorically enounced, this fallacy of unreal reason will coincide with the categorical fallacy of unreal universality. Thus, the second example above alleged:

If the stars move themselves they are animated;
But the stars do move themselves;
Therefore, the stars are animated:

is thus expressed by a categorical equivalent:

> *All bodies that move themselves are animated;*
> *But the stars move themselves;*
> *Therefore, the stars are animated.*

In the one case, the sumption ostensibly contains the subsumption and conclusion, as the correlative parts of a cáusal whole; in the other, as the correlative parts of an extensive whole, or, had the categorical syllogism been so cast, of an intensive whole. The two genera of sophisms may, therefore, it is evident, be considered as one—taking, however, in their particular manifestation, either a categorical or a hypothetical form.

I may notice that the sophism of Unreal Generality, or Unreal Reason, is hardly more dangerous in its positive than in its negative relation. For we are not more disposed lightly to assume as absolutely universal what is universal in relation to our experience, than lightly to deny as real what comes as an exception to our factitious general law. Thus it is that men having once generalized their knowledge into a compact system of laws, are found uniformly to deny the reality of all phenomena which can not be comprehended under these. They not only pronounce the laws they have generalized as veritable laws of nature, which, haply, they may be, but they pronounce that there are no higher laws; so that all which does not at once find its place within their systems, they scout, without examination, as visionary and fictitious. So much for this ground of fallacy in general; we now proceed to the species.

Fallacy of Unreal Reason as dangerous in its negative as in its positive form.

Now, as unreal reasons may be conceived infinite in number, the minor species of this class of sophisms can not be enumerated; I shall, therefore, only take notice of the more remarkable, and which, in consequence of their greater notoriety, have been honored with distinctive appellations.

Species of the fallacy of Unreal Reason.

Of these, the first is the *Sophisma cum hoc (vel post hoc),*
ergo propter hoc. This fallacy arises when,
from the contingent consecution of certain
phenomena in the order of time, we infer
their mutual dependence as cause and effect.
When, for example, among the ancient Romans, a general,
without carefully consulting the augurs, engaged the enemy,
and suffered a defeat, it was inferred that the cause of the
disaster was the unfavorable character of the auspices. In
like manner, to this sophism belongs the conclusion, so long
prevalent in the world, that the appearance of a comet was the
harbinger of famine, pestilence, and war. In fact, the greater
number of the hypotheses which constitute the history of
physics and philosophy, are only so many examples of this
fallacy. But no science has exhibited and exhibits so many
flagrant instances of the sophism *cum hoc, ergo propter hoc,*
as that of medicine; for, in proportion as the connection of
cause and effect is peculiarly obscure in physic, physicians have
only been the bolder in assuming that the recoveries which
followed after their doses, were not concomitants, but effects.
This sophism is, in practice, of great influence and very fre-
quent occurrence; it is, however, in theory, too perspicuous to
require illustration.

(a) *Sophisma cum hoc (vel post hoc), ergo propter hoc.*

The second fallacy is that which has obtained the name of
Ignava ratio, or *Sophisma pigrum*—in Greek,
ἀργὸς λόγος. The excogitation of this argu-
ment is commonly attributed to the Stoics, by whom it was
employed as subsidiary to their doctrine of fate. It is an argu-
ment by which a man endeavors to vindicate his inactivity in
some particular relation, by the necessity of
the consequence. It is a hypothetico-dis-
junctive syllogism, and, when fully expressed, is as follows:

(b) *Ignava Ratio.*

Example.

Sumption.........*If I ought to exert myself to effect a certain event, this*
event either must take place or it must not;
Subsumption.....*If it must take place, my exertion is superfluous; if it*
must not take place, my exertion is of no avail;
Conclusion ....*Therefore, on either alternative, my exertion is useless.*

Cicero, in the twelfth chapter of his book, *De Fato*, thus states it:

If it be fated that you recover from your present disease, whether you call in a doctor or not, you will recover; again, if it be fated that you do not recover from your present disease, whether you call in a doctor or not, you will not recover;
But one or other of the contradictories is fated;
Therefore, to call in a doctor is of no consequence.

Others have enounced the sumption in various forms, for example: *If it be impossible but that you recover from the present disease*, etc., *or*, *If it be true that you will recover from this disease;* or, *If it be decreed by God that you will not die of this disease*, and so likewise in different manners; according to which like-

Its various designations.

wise the question itself has obtained various titles, as *Argument De Fato, De Possibilibus, De Libero Arbitrio, De Providentia, De Divinis Decretis, De Futuris Contingentibus, De Physica Prœdeterminatione*, etc. No controversy is more ancient, none more universal, none has more keenly agitated the minds of men, none has excited a greater influence upon religion and morals; it has not only divided schools, but nations: and has so modified not only their opinions, but their practice, that while the Turks, as converts to the doctrine of Fate, take not the slightest precaution in the midst of pestilence, other nations, on the contrary, who admit the contingency of second causes, carry their precautionary policy to an opposite excess.

The lazy reason, the reaper, and *the controlling reason*, are only various names for the same process.

In regard to the vice of this sophism, it is manifest that it lies in the sumption, in which the disjunct members are imperfectly enounced. It ought to have been thus conceived: If I ought to exert myself to effect a certain event, which I can not, however, of myself effect, this event must either take place from other causes, or it must not take place at all. It is only under

The vice of this sophism.

such a condition that my exertion can, on either alternative, be useless, and not if the event depend wholly or in part for its accomplishment on my exertion itself, as the *conditio sine qua non*. It is plain, however, that the refutation of this sophism does not at all affect the doctrine of necessity ; for this doctrine, except in its very absurdest form—the *Fatum Turcicum* —makes no use of such a reasoning.

The third fallacy is the *Sophisma polyzeteseos* or *quæstionis duplicis*—*the sophism of continuous question-ing*, which attempts, from the impossibility of assigning the limit of a relative notion, to show by continued interrogation the impossibility of its determination at all. There are certain notions which are only conceived as relative—as proportional, and whose limits we can not, therefore, assign by the gradual addition or detraction of one determination. But there is no consequence in the proposition, that, if a notion can not be determined in this manner, it is incapable of all determination, and, therefore, absolutely inconceivable and null. Such is the Sorites. This reasoning, as applied to various objects, obtained various names, as, besides the Sorites or Acervus, we have the *crescens*—the ψαλακρός or *calvus*— the ὑπερθετικός, *superpositus* or *superlativus*—the ἡσυχάζων or *quiescens*, etc., etc. The Sorites is well defined by Ulpian, a sophism in which, by very small degrees, the disputant is brought from the evidently true to the evidently false. For example, I ask, Does one grain of corn make up a heap of grain ? My opponent answers—No. I then go on asking the same question of two, three, four, and so on *ad infinitum*, nor can the respondent find the number at which the grains begin to constitute a heap. On the other hand, if we depart from the answer—that a thousand grains make a heap, the interrogation may be continued downward to unity, and the answerer be unable to determine the limit where the grains cease to make up a heap. The same process may be performed, it is

(c) *Sophisma polyze-teseos.*

Its various designa-tions.

manifest, upon all the notions of proportion, in space, and time, and degree, both in continuous and discrete quantity.

The fourth and last fallacy of this class is the *sophisma heterozeteseos*, or *sophism of counter-questioning*, and as applied to various objects, it obtained, among the ancients, the names of *the Dilemma, the Cornutus, the Litigiosus, the Achilles, the Mentiens, the Fallens, the Electra, the Obvelatus, the Reciprocus, the Crocodilinus, the οὔτις, the Inductio imperfecta;* and to this should also be referred the Ass of Buridanus. It is a hypothetico-disjunctive reasoning, which rests on a certain supposition, and which, through a reticence of this supposition, deduces a fallacious inference. To take, for an example of this fallacy, the κεράτινος or Cornutus: it is asked: Have you cast your horns? If you answer, I have; it is rejoined, Then you have had horns: if you answer, I have not, it is rejoined, Then you have them still. To this question, and to the inferences from it, the disjunctive proposition is supposed—A certain subject has either had horns or has them still. This disjunction is, however, only correct if the question is concerning a subject to which horns previously belonged. If I do not suppose this, the disjunction is false; it must, consequently, thus run: a certain subject has either had or not had horns. In the latter case they could not of course be cast. The alternative inferences—*then you have had them, or then you have them still*—have no longer ground or plausibility. To take another instance in the *Litigiosus* or *Reciprocus.* Of the history of this famous dilemma there are two accounts, the Greek and the Roman. The Roman account is given us by Aulus Gellius, and is there told in relation to an action between Protagoras, the prince of the Sophists, and Euathlus, a young man, his disciple. The disciple had covenanted to give his master a large sum to accomplish him as a legal rheto-

(d) *Sophisma heterozeteseos.*

Its various names.

Its character.

The *Litigiosus.*

The case of Protagoras and Euathlus.

rician ; the one half of the sum was paid down, and the other
was to be paid on the day when Euathlus should plead and
gain his first cause. But when the scholar, after the due course
of preparatory instruction, was not in the same hurry to com-
mence pleader as the master to obtain the remainder of his fee,
Protagoras brought Euathlus into court, and addressed his
opponent in the following reasoning : Learn, most foolish of
young men, that however matters may·turn up—whether the
decision to-day be in your favor or against you—pay me my
demand you must. For if the judgment be against you, I
shall obtain the fee by decree of the court, and if in your favor,
I shall obtain it in terms of the compact, by which it became
due on the very day you gained your first cause. You thus
must fail, either by judgment or by stipulation. To this
Euathlus rejoined : Most sapient of masters, learn from your
own argument, that whatever may be the finding of the court,
absolved I must be from any claim by you. For if the deci-
sion be favorable, I pay nothing by the sentence of the judges,
but if unfavorable, I pay nothing in virtue of the compact,
because, though pleading, I shall not have gained my cause.
The judges, says Gellius, unable to find a *ratio decidendi*,
adjourned the case to an indefinite day, and ultimately left it
undetermined. I find a parallel story told, among the Greek
writers, by Arsenius, by the Scholiast of Her-

Parallel case of Co-
rax and Tisias.

mogenes, and by Suidas, of the rhetorician
Corax (*anglicè* Crow) and his scholar Tisias.
In this case, the judges got off by delivering a joke against
both parties, instead of a decision in favor of either. We
have here, they said, the plaguy egg of a plaguy crow, and
from this circumstance is said to have originated the Greek
proverb, κακοῦ κόρακος κακὸν ὠόν.

Herewith we terminate the First Great Division of Pure
Logic—Stoicheiology, or the Doctrine of Elements.

PART II.

METHODOLOGY.

SECTION I.—METHOD IN GENERAL.

¶ LXXX. A Science is a complement of cognitions, hav-
ing, in point of Form, the character of
Logical Perfection; in point of Matter, the
character of Real Truth.

The constituent attributes of Logical Perfection are the
Perspicuity, the *Completeness*, the *Harmony*, of Knowledge.
But the Perspicuity, Completeness, and Harmony of our cog-
nitions are, for the human mind, possible only through *Method*.

Method in general denotes a procedure in the treatment of
an object, conducted according to determinate rules. Method,
in reference to Science, denotes, therefore, the arrangement and
elaboration of cognitions, according to definite rules, with the
view of conferring on these a Logical Perfection. The Methods
by which we proceed in the treatment of the objects of our
knowledge are two; or rather Method, considered in its integ-
rity, consists of two processes, *Analysis* and *Synthesis*.

I. The Analytic or Regressive; in which, departing from
the individual and the determined, we ascend always to the
more and more general, in order finally to attain to ultimate
principles.

II. The Synthetic or Progressive; in which we depart from
principles or universals, and from these descend to the determ-
ined and the individual.

Through the former we investigate and ascertain the reality

of the several objects of science ; through the latter we connect
the fragments of our knowledge into the unity of a system.

In its Stoicheiology, or Doctrine of Elements, Logic con-
siders the conditions of possible thought ; for

Explication.
Possibility and Per-
fection of Thought.

thought can only be exerted under the gen-
eral laws of Identity, Contradiction, Excluded
Middle, and Reason and Consequent ; and
through the general forms of Concepts, Judgments, and Reason-
ings. These, therefore, may be said to constitute the Elements
of thought. But we may consider thought not merely as
existing, but as existing well ; that is, we may consider it not
only in its possibility, but in its perfection ; and this perfection,
in so far as it is dependent on the form of thinking, is as much
the object-matter of Logic as the mere possibility of thinking.
Now that part of Logic which is conversant with the Perfec-
tion, with the Well-being of thought, is the doctrine of
Method—Methodology.

Method in general is the regulated procedure toward a cer-
tain end ; that is, a process governed by

Method in general,
—what.

rules, which guide us by the shortest way
straight toward a certain point, and guard us
against devious aberrations. Now the end of thought is truth,
knowledge, science, expressions which may here be considered

Science—what.

as convertible. Science may, therefore, be
regarded as the perfection of thought, and
to the accomplishment of this perfection the Methodology of
Logic must be accommodated and conducive. But Science,
that is, a system of true or certain knowledge, supposes two
conditions. Of these, the first has a relation

Its perfection Form-
al and Material.

to the knowing subject, and supposes that
what is known is known clearly and dis-
tinctly, completely, and in connection. The second has a
relation to the objects known, and supposes that what is known
has a true or real existence. The former of these constitutes
the Formal Perfection of science, the latter is the Material.

Now, as Logic is a science exclusively conversant about the form of thought, it is evident that of these two conditions, of these two elements, of science or perfect thinking, Logic can only take into account the formal perfection, which may, therefore, be distinctively denominated the *logical perfection* of thought. Logical Methodology will, therefore, be the exposition of the rules and ways by which we attain the formal or logical perfection of thought.

Logic takes into account only the formal perfection of science.

Logical Methodology —what.

But Method, considered in general, considered in its unrestricted universality, consists of two processes, correlative and complementary of each other. For it proceeds either from the whole to the parts, or from the parts to the whole. As proceeding from the whole to the parts, that is, as resolving, as unloosing, a complex totality into its constituent elements, it is Analytic; as proceeding from the parts to the whole, that is, as recomposing constituent elements into their complex totality, it is Synthetic. These two processes are not, in strict propriety, two several methods, but together constitute only a single method. Each alone, is imperfect; each is conditioned or consummated by the other; and Analysis and Synthesis are as necessary to themselves and to the life of science, as expiration and inspiration, in connection, are necessary to each other, and to the possibility of animal existence.

Method in general consists of two correlative and complementary processes, Analysis and Synthesis.

It is here proper to make you aware of the confusion which prevails in regard to the application of the terms *Analysis* and *Synthesis*. It is manifest, in general, from the meaning of the words, that the term *analysis* can only be applied to the separation of a whole into its parts, and that the term *synthesis* can only be applied to the collection of parts into a whole. So far, no ambiguity is possible, no room is left for abuse. But you are aware that there are

Confusion in regard to the application of the terms Analysis and Synthesis.

different kinds of whole and parts; and that some of the wholes,
like the whole of Comprehension (called also
the *Metaphysical*), and the whole of Exten-
sion (called also the *Logical*), are in the
inverse ratio of each other; so that what
in the one is a part, is necessarily in the
other a whole. It is evident, then, that the
counter processes of Analysis and Synthesis, as applied to
these counter wholes and parts, should fall into one, or corres-
pond; inasmuch as each in the one quantity should be dia-
metrically opposite to itself in the other. Thus Analysis, as
applied to Comprehension, is the reverse process of Analysis
as applied to Extension, but a corresponding process with
Synthesis; and *vice versa*. Now, should it happen that the
existence and opposition of the two quantities are not consid-
ered, that men, viewing the whole of Extension or the whole
of Comprehension, each to the exclusion of the other, must
define Analysis and Synthesis with reference to that single
quantity which they exclusively take into account; on this
supposition, I say, it is manifest that, if different philoso-
phers regard different wholes or quantities,
we may have the terms *analysis* and *synthesis*
absolutely used by different philosophers in
a contrary or reverse sense. And this has
actually happened. The ancients, in general,
looking alone to the whole of Extension, use the terms *analy-
sis* and *analytic* simply to denote a division of·the genus into
species, of the species into individuals; the moderns, on the
other hand, in general, looking only at the whole of Compre-
hension, employ these terms to express a resolution of the
individual into its various attributes. But though the contrast
in this respect between the ancients and moderns holds in
general, still it is exposed to sundry exceptions; for, in both
periods, there are philosophers found at the same game of
cross-purposes with their contemporaries as the ancients and
moderns in general are with each other. This difference, which

*These counter pro-
cesses as applied to the
counter wholes of Com-
prehension and Exten-
sion correspond with
each other.*

*Hence the terms
Analysis and Synthesis
used in a contrary
sense.*

has never, as far as I know, been fully observed and stated, is the cause of great confusion and mistake. It is proper, therefore, when we use these terms, to use them not in exclusive relation to one whole more than to another; and, at the same time, to take care that we guard.against the misapprehension that might arise from the vague and one-sided view which is now universally prevalent. So much for the meaning of the words *analytic* and *synthetic*, which, by the way, I may notice, are, like most of our logical terms, taken from Geometry.

The Synthetic Method is likewise called the *Progressive*; the Analytic is called the *Regressive*. Now

The Synthetic Method has been called the Progressive, and the Analytic the Regressive. These designations wholly arbitrary, and of various application.

it is plain that this application of the terms *progressive* and *regressive* is altogether arbitrary. For the import of these words expresses a relation to a certain point of departure—a *terminus a quo*, and to a certain point of termination—a *terminus ad quem*; and if these have only an arbitrary existence, the correlative words will, consequently, only be of an arbitrary application. But it is manifest that the point of departure—the point from which the Progressive process starts—may be either the concrete realities of our experience—the *principiata*—the *notiora nobis*; or the abstract generalities of Intelligence—the *principia*—the *notiora natura*. Each of these has an equal right to be regarded as the starting-point. The Analytic process is chronologically first in the order of knowledge, and we may, therefore, reasonably call it the *progressive*, as starting from the primary data of our observation. On the other hand, the Synthetic process, as following the order of constitution, is first in the order of nature, and we may, therefore, likewise reasonably call it the *progressive*, as starting from the primary elements of existence. The application of these terms as synonyms of the analytic and synthetic processes, is, as wholly arbitrary, manifestly open to confusion and contradiction. And such has been the case. I find that the pilosophers are as much at

cross-purposes in their application of these terms to the Analytic and Synthetic processes, as in the application of analysis and synthesis to the different wholes.

In general, however, both in ancient and modern times, Synthesis has been called the *Progressive*, Analysis the *Regressive*, process; an application of terms which has probably taken its rise from a passage in Aristotle, who says that there are two ways of scientific procedure—the one from principle (ἀπὸ τῶν ἀρχῶν), the other to principles (ἐπί τὰς ἀρχὰς). From this, and from another similar passage in Plato, the term *progressive* has been applied to the process of Comprehensive Synthesis (*progrediendi a principiis ad principiata*), the term *regressive*, to·the process of Comprehensive Analysis (*progrediendi a principiatis ad principia*).

In general, Synthesis has been designated the Progressive, and Analysis the Regressive Process.

So much for the general relations of Method to thought, and the general constituents of Method itself. It now remains to consider what are the particular applications of Method, by which Logic accomplishes the Formal Perfection of thought. In doing this, it is evident that, if the formal perfection of thought is made up of various virtues, Logic must accommodate its method to the acquisition of these in detail; and that the various processes by which these several virtues are acquired, will, in their union, constitute the system of Logical Methodology. On this I will give you a paragraph.

Method in Special.

¶ LXXXI. The formal Perfection of thought is made up of the three virtues or characters: 1°. Of *Clearness;* 2°. Of *Distinctness,* involving *Completeness;* and, 3°. Of *Harmony.* The character of Clearness depends principally on the determination of the Comprehension of our notions; the character of Distinctness depends principally on the development of the Extension of our· notions; and the character of Harmony, on the mutual Concatenation of our notions. The

LXXXI. Logical Methodology—its Three Parts.

rules by which these three conditions are fulfilled, constitute the Three Parts of Logical Methodology. Of these, the first constitutes the *Doctrine of Definition ;* the second, the *Doctrine of Division ;* and the third, the *Doctrine of Probation.*

When we turn attention on our thoughts, and deal with them to the end that they may be constituted into a scientific whole, we must perform a threefold operation. We must, first of all, consider what we think, that is, what is comprehended in a thought. In the second place, we must consider how many things we think of, that is, to how many objects the thought extends or reaches, that is, how many are conceived under it. In the third place, we must consider why we think so and so, and not in any other manner ; in other words, how the thoughts are bound together as reasons and consequents. The first consideration, therefore, regards the comprehension ; the second, the extension ; the third, the concatenation of our thoughts. But the comprehension is ascertained by definitions ; the extension by divisions ; and the concatenation by probations.

Explication.

SECTION II.—METHOD IN SPECIAL OR LOGICAL METHODOLOGY.

I.—DOCTRINE OF DEFINITION.

¶ LXXXII. How to make a notion Clear, is shown by the logical doctrine of *Declaration*, or *Definition* in its wider sense. A Declaration (or Definition in its wider sense) is a Categorical Proposition, consisting of two clauses or members, viz., of a Subject Defined (*membrum definitum*) and of the Defining Attributes of the subject, that is, those by which it is distinguished from other things (*membrum definiens*). This latter member really contains the Definition, and is often itself so denominated. Simple notions, as containing no plurality of attributes, are incapable of definition.

LXXXII. I. The Doctrine of Declaration or Definition.

The terms *declaration* and *definition*, which are here used as applicable to the same process, express it, however, in different aspects. The term *declaration* (*declaratio*) is a word somewhat vaguely employed in English; it is here strictly in its proper sense of *throwing light upon—clearing up*. The term *definition* (*definitio*) is employed in a more general, and in a more special, signification. Of the latter we are soon to speak. At present, it is used simply in the meaning of an *enclosing within limits—the separating a thing from others*. Were the term *declaration* not of so vague and vacillating a sense, it would be better to employ it alone in the more general acceptation, and to reserve the term *definition* for the special signification.

Explication.
The terms Declaration and Definition express the same process in different aspects.

¶ LXXXIII. The process of Definition is founded on the logical relations of Subordination, Coördination, and Con-

gruence. To this end we discriminate the constituent characters of a notion into the *Essential*, or those which belong to it in its unrestricted universality, and into the *Unessential*, or those which belong to some only of its species. The Essential are again discriminated into *Original* and *Derivative*, a division which coincides with that into Internal or Proper, and External. In giving the sum of the original characters constituent of a notion, consists its *Definition* in the stricter sense. A Definition in the stricter sense must consequently afford at least two, and properly only two, original characters, viz., that of the *Genus* immediately superior (*genus proximum,*) and that of the *Difference* by which it is itself marked out from its coördinates as a distinct species (*nota specialis, differentia specifica.*

Declarations (or definitions in the wider sense) obtain various denominations, according as the process is performed in different manners and degrees. A Declaration is called an *Explication* (*explicatio*), when the predicate or defining member indeterminately evolves only some of the characters belonging to the subject. It is called an *Exposition* (*expositio*), when the evolution of a notion is continued through several explications. It is called a *Description* (*descriptio*), when the subject is made known through a number of concrete characteristics. Finally, it is called a *Definition Proper*, when, as I have said, two of the essential and original attributes of the defined subject are given, whereof the one is common to it with the various species of the same genus, and the other discriminates it from these.

Definitions are distinguished also into Verbal or Nominal, into Real, and into Genetic (*definitiones nominales, reales, geneticæ*), according as they are conversant with the meaning of a term, with

the nature of a thing, or with its rise or production. Nominal Definitions are, it is evident, merely explications. They are, therefore, in general only used as preliminary, in order to prepare the way for more perfect declarations. In Real Definitions the thing defined is considered as already there, as existing (ὄν), and the notion, therefore, as given, precedes the definition. They are thus merely analytic, that is, nothing is given explicitly in the predicate or defining member, which is not contained implicitly in the subject or member defined. In Genetic Definitions the defined subject is considered as in the progress to be, as becoming—γιγνόμενον; the notion, therefore, has to be made, and is the result of the definition, which is consequently synthetic, that is, places in the predicate or defining member more than is given in the subject or member defined. As examples of these three species, the following three definitions of a circle may suffice: 1. The Nominal Definition—The word *circle* signifies a uniformly curved line. 2. The Real Definition—A circle is a line returning upon itself, of which all the parts are equidistant from a given point. 3. The Genetic Definition—A circle is formed when we draw around, and always at the same distance from, a fixed point, a movable point which leaves its trace, until the termination of the movement coincides with the commencement. It is to be observed that only those notions can be genetically defined, which relate to quantities represented in time and space. Mathematics are principally conversant with such notions, and it is to be noticed that the mathematician usually denominates such genetic definitions *real definitions*, while the others he calls without distinction *nominal definitions*.

The laws of Definition are given in the following paragraph.

¶ LXXXIV. A definition should be Adequate (*adequata*), that is, the subject defined, and the predicate defining, should be equivalent or of the same extension. If not, the sphere of the predicate is either less than that of the subject, and the definition

LXXXIV. Definition —its Laws.

Too Narrow (*angustior*), or greater, and the definition Too Wide (*latior*).

II. It should not define by Negative or Divisive attributes (*Ne sit negans, ne fiat per disjuncta*).

III. It should not be Tautological—what is contained in the defined, should not be repeated in the defining clause (*Ne sit circulus vel diallelon in definiendo*).

IV. It should be Precise, that is, contain nothing unessential, nothing superfluous (*Definitio ne sit abundans*).

V. It should be Perspicuous, that is, couched in terms intelligible, and not figurative, but proper and compendious.

The First of these rules: That the definition should be adequate, that is, that the *definiens* and *definitum* should be of the same extension, is too manifest to require much commentary. Is the definition too wide? then more is declared than ought to be declared; is it too narrow? then less is declared than ought to be declared; and in either case, the definition does not fully accomplish the end which it proposes. To avoid this defect in definition, we must attend to two conditions. In the first place, that attribute should be given which the thing defined has in common with others of the same class; and, in the second place, that attribute should be given which not only distinguishes it in general from all other things, but proximately from things which are included with it under a common class. This is expressed by Logicians in the rule—*Definitio constet genere proximo et differentia ultima*—Let the definition consist of the nearest genus and of the lowest difference. But as the notion and its definition, if the rule be obeyed, are necessarily identical or convertible notions, they must necessarily have the same extent; consequently, everything to which the definition applies, and nothing to which it does not apply, is the thing defined. Thus: if the definition, *Man is a rational animal*, be adequate, we shall be able to say—*Every rational animal is human: nothing which is not a rational animal is human*. But

Explication.
First Rule.

we can not say this, for though this may be true of this earth, we can conceive in other worlds rational animals which are not human. The definition is, therefore, in this case too wide; to make it adequate, it will be necessary to add *terrestial* or some such term—as, *Man is a rational animal of this earth.* Again, were we to define Man—*a rationally acting animal of this earth*—the definition would be too narrow; for it would be false to say, *no animal of this earth not acting rationally is human*, for not only children, but many adult persons would be excluded by this definition, which is, therefore, too narrow.

The Second Rule is—That the definition should not be made by negations, or disjunctions. In regard to

Second Rule.

the former—negations—that we should define a thing by what it is, and not by what it is not—the reason of the rule is manifest. The definition should be an affirmative proposition, for it ought to contain the positive, the actual, qualities of the notion defined, that is, the qualities which belong to it, and which must not, therefore, be excluded from or denied of it. If there are characters which, as referred to the subject, afford purely negative judgments; this is a proof that we have not a proper comprehension of the notion, and have only obtained a precursory definition of it, inclosing it within only negative boundaries. For a definition which contains only negative attributions, affords merely an empty notion—a notion which is to be called a *nothing;* for, as some think, it must at least possess one positive character, and its definition can not, therefore, be made up exclusively of negative attributes. If, however, a notion stands opposed to another which has already been declared by positive characters, it may be defined by negative characters—provided always that the genus is positively determined. Thus Cuvier and other naturalists define a certain order of animals by the negation of a spine or back-bone—the *invertebrata* as opposed to the *vertebrata;* and many such definitions occur in Natural History.

For a similar reason, the definition must not consist of divisive or disjunctive attributions. The end of a definition is

a clear and distinct knowledge. But to say that a thing is this or that or the other, affords us either no knowledge at all, or at best only a vague and obscure knowledge. If the disjunction be contradictory, its enunciation is, in fact, tantamount to zero; for to say that a thing either is or is not so and so, is to tell us that of which we require no assertion to assure us. But a definition by disparate alternatives is, though it may vaguely circumscribe a notion, only to be considered as a prelusory definition, and as the mark of an incipient and yet imperfect knowledge. We must not, however, confound definitions by divisive attributes with propositions expressive of a division.

The Third Rule is—The definition should not be tautological; that is, what is defined should not be defined by itself. This vice is called *defining in a circle*. This rule may be violated either immediately or mediately. The definition—*Law is a lawful command*—is an example of the immediate circle. A mediate circle requires, at least, two correlative definitions, a principal and a subsidiary. For example—*Law is the expressed wish of a ruler, and a ruler is one who establishes laws.* The circle, whether immediate or mediate, is manifest or occult according as the thing defined is repeated in the same terms, or with other synonymous words. In the previous example it was manifest. In the following it is concealed—*Gratitude is a virtue of acknowledgment—Right is the competence to do or not to do.* Such declarations may, however, be allowed to stand as prelusory or nominal definitions. Concealed circular definitions are of very frequent occurrence, when they are at the same time mediate or remote; for we are very apt to allow ourselves to be deceived by the difference of expression, and fancy that we have declared a notion when we have only changed the language. We ought, therefore, to be strictly on our guard against this besetting vice. The ancients called the circular definition also by the name of *Diallelon*, as in this case we declare the *definitum* and the *definiens* reciprocally by each

Third Rule.
Defining in a circle.

other (δὶ ἀλλήλων). In probation there is a similar vice which bears the same names. We may, I think, call them by the homely English appellation of the *Seesaw*.

The Fourth Rule is : That the definition should be precise ;

Fourth Rule.

that is, contain nothing unessential, nothing superfluous. Unessential or contingent attributes are not sufficiently characteristic, and as they are now present, now absent, and may likewise be met with in other things which are not comprehended under the notion to be defined, they, consequently, if admitted into a definition, render it sometimes too wide, sometimes too narrow. The well-known Platonic definition—"*Man is a two-legged animal without feathers*"—could, as containing only unessential characters, be easily refuted, as was done by a plucked cock. And when a definition is not wholly made up of such attributes, and when, in consequence of their intermixture with essential characters, the definition does not absolutely fail, still there is a sin committed against logical purity or precision, in assuming into the declaration qualities such as do not determinately designate what is defined. On the same principle, all derivative characters ought to be excluded from the definition ; for although they may necessarily belong to the thing defined, still they overlay the declaration with superfluous accessories, inasmuch as such characters do not designate the original essence of the thing, but are a mere consequence thereof. This fault is committed in the following definition : *The Circle is a curved line returning upon itself, the parts of which are at an equal distance from the central point.* Here precision is violated, though the definition be otherwise correct. For that every line returning upon itself is curved, and that the point from which all the parts of the line are equidistant is the central point ; these are mere consequences of the returning on itself, and of the equidistance. Derivative characters are thus mixed up with the original, and the definition, therefore, is not precise.

The Fifth rule is : That the definition

Fifth Rule.

should be perspicuous, that is, couched in

terms intelligible, not figurative, and compendious. That defini-
tions ought to be perspicuous, is self-evident. For why do we
declare or define at all? The perspicuity of the definition
depends, in the first place, on the intelligible

*In order to perspi-
cuity in Definition, 1.
The language must be
intelligible.* character of the language, and this again
depends on the employment of words in their
received or ordinary signification. The mean-
ing of words, both separate and in con-
junction, is already determined by conventional usage; when,
therefore, we hear or read these, we naturally associate with
them their ordinary meaning. Misconceptions of every kind
must, therefore, arise from a deviation from the accustomed
usage; and though the definition, in the sense of the definer,
may be correct, still false conceptions are almost inevitable for
others. If such a deviation becomes necessary, in consequence
of the common meaning attached to certain words not corres-
ponding to certain notions, there ought at least to be appended
a comment or nominal definition, by which we shall be warned
that such words are used in an acceptation wider or more re-
stricted than they obtain in ordinary usage. But, in the second
place, words ought not only to be used in their usual significa-
tion—that signification, if the definition be perspicuous, must
not be figurative but proper. Tropes and figures are logical
hieroglyphics, and themselves require a declaration. They do
not indicate the thing itself, but only some-

*2. The meaning must
be not figurative, but
proper.* thing similar. Such, for example, are the
definitions we have of Logic as the *Pharus
Intellectus*, the *Lighthouse of the Understand-
ing;* the *Cynosura Veritatis*, the *Cynosure of the Truth;* the
Medicina Mentis, the *Physic of the Mind;* etc.

However, many expressions, originally metaphorical (such
as *conception, imagination, comprehension, representation*, etc.,
etc.), have by usage been long since reduced from figurative to
proper terms, so that we may employ these in definitions with-
out scruple—nay frequently must, as there are no others to
be found.

In the third place, the perspicuity of a definition depends upon its brevity. A long definition is not

3. The definition must be brief. only burthensome to the memory, but likewise to the understanding, which ought to comprehend it at a single jet. Brevity ought not, however, to be purchased at the expense of perspicuity or completeness.

The rules hitherto considered proximately relate to Definitions in the stricter sense. In reference to

The other kinds of Declaration. the other kinds of Declaration, there are

Dilucidations or Explications. certain modifications and exceptions admitted. These Dilucidations or Explications, as they make no pretense to logical perfection, and are only subsidiary to the discovery of more perfect definitions, are not to be very rigidly dealt with. They are useful, provided they contain even a single true character by which we are conducted to the apprehension of others. They may, therefore, be sometimes too wide, sometimes too narrow. A contingent and derivative character may be also useful for the discovery of the essential and original. Even

Circular Definitions. Circular Definitions are not here absolutely to be condemned, if thereby the language is rendered simpler and clearer. Figurative Expressions are like-

Figurative Expressions. wise in them less faulty than in definitions proper, inasmuch as such expressions, by the analogies they suggest, contribute always something to the illustration of the notion.

In regard to Descriptions, these must be adequate, and no circle is permitted in them. But they need not be so precise

Descriptions. as to admit of no derivative or contingent characters. For descriptions ought to enumerate the characters of a thing as fully as possible; and, consequently, they can not be so brief as definitions. They can not, however, exceed a certain measure in point of length.

SECTION II.—LOGICAL METHODOLOGY.

II.—DOCTRINE OF DIVISION.

UNDER Division (*divisio*, διαίρεσις) we understand in general the sundering of the whole into its parts.
Division in general. The object which is divided is called the *divided whole (totum divisum)*, and this whole must be a connected many—a connected multiplicity, for otherwise no division would be possible. The divided whole must comprise at least one character, affording the condition of a certain possible splitting of the object, or through which a certain opposition of the object becomes recognized; and this character must be an essential attribute of the object, if the division be not aimless and without utility. This point of view, from which alone the division is possible, is called the *principle of the division* (*principium sive fundamentum divisionis*); and the parts which, by the distraction of the whole, come into view, are called the *divisive members (membra dividentia)*. When a whole is divided into its parts, these parts may, either all or some, be themselves still connected multiplicities; and if these are again divided, there results a *subdivision (subdivisio)*, the several parts of which are called the *subdivisive members (membra subdividentia)*. One and the same object may, likewise, be differently divided from different points of view, whereby *condivisions (condivisiones)* arise, which, taken together, are all reciprocally coördinated. If a division has only two members, it is called a *dichotomy (dichotomia)*; if three, a *trichotomy (trichotomia)*; if four, a *tetrachotomy*; if many, a *polytomy*, etc.

Division, as a genus, is divided into two species, according to the different kind of whole which it sunders into parts. These parts are either contained **Division of two species, Partition and Logical Division.** in the divided whole, or they are contained under it. In the former case the division is

called a *partition* (*partitio*, ἀπαρίϑμησις), in the latter, it is named a *logical division*. Partition finds an application only when the object to be divided is a whole compounded of parts, consequently, where the notion of the object is a complex one; Logical Division, on the other hand, finds its application only where the notion contains a plurality of characters under it, and where, consequently, the notion is a universal one. The simple notion is thus the limit of Partition; and the individual or singular is thus the limit of Division. Partition is divided into a *physical* or *real*, when the parts can actually be separated from each other; and into a *metaphysical* or *ideal*, when the parts can only be sundered by Abstraction. It may be applied in order to attain to a clear knowledge of the whole, or to a clear knowledge of the parts. In the former case, the parts are given and the whole is sought; in the latter, the whole is given and the parts are sought. If the whole be given and the parts sought out, the object is first of all separated into its proximate, and, thereafter, into its remoter parts, until either any further partition is impossible, or the partition has attained its end. To this there is, however, required an accurate knowledge of the object, of its parts proximate and remote, and of the connection of these parts together, as constituting the whole. We must, likewise, take heed whether the partition be not determined from some particular point of view, in consequence of which the notions of more proximate and more remote may be very vague and undetermined. If the parts be given, and from them the whole sought out, this is accomplished when we have discovered the order, the arrangement of the parts; and this again is discovered when the principle of division is discovered; and of this we must obtain a knowledge, either from the general nature of the thing, or from the particular end we have in view. If, for example, a multitude of books, of every various kind, are arranged into the whole of a well-ordered library, in this case the greater or lesser similarity of subject will afford, either exclusively or mainly, the principle of divi-

Partition either Real or Ideal.

sion. It happens, however, not unfrequently, that the parts are ordered or arranged according to different rules, and by them connected into a whole; and, in this case, as the different rules of the arrangement can not together and at once accomplish this, it is proper that the less important arrangement should yield to the more important; as, for example, in the ordering of a library, when, besides the contents of the books, we take into account their language, size, antiquity, binding, etc.

¶ LXXXV. The Distinctness and Completeness of our knowledge is obtained by that logical process which is termed *Division* (*divisio, διαίρεσις*).

LXXXV. Logical Division.

Division supposes the knowledge of the whole to be given through a foregone process of Definition or Declaration; and proposes to discover the parts of this whole which are found and determined not by the development of the Comprehension, but by the development of the Extension. As Logical Definition, therefore, proposes to render the characters contained in an object, that is, the comprehension of a reality or notion, Clear; Logical Division proposes to render the characters contained under an object, that is, the extension of a notion, Distinct and Exhaustive. Division is, therefore, the evolution of the extension of a notion; and it is expressed in a disjunctive proposition, of which the notion divided constitutes the subject, and the notions contained under it, the predicate. It is, therefore, regulated by the law which governs Disjunctive Judgments (the Principle of Excluded Middle), although it is usually expressed in the form of a Copulative Categorical Judgment. The rules by which this process is regulated are seven:

1°. Every Division should be governed by some principle (*Divisio ne careat fundamento*).

2°. Every Division should be governed by only a single principle.

3°. The principle of Division should be an actual and essen-

tial character of the divided notion, and the division, therefore, neither complex nor without a purpose.

4°. No divided member of the predicate must by itself exhaust the subject.

5°. The dividing members, taken together, must exhaust, but only exhaust, the subject.

6°. The divisive members must be reciprocally exclusive.

7°. The divisions must proceed continuously from immediate to mediate differences (*Divisio ne fiat per saltum*).

In this paragraph are contained, first, the general Principles of Logical Division, and secondly, the Laws by which it is governed. I shall now illustrate these in detail.

Explication.

In the first place, it is stated that the distinctness and completeness of our knowledge is obtained by that logical process which is termed *Division* (*divisio, διαίρεσις*). Division supposes the knowledge of the whole to be given through a foregone process of definition, and proposes to discover the parts of this whole which are found and determined not by the development of the comprehension, but by the development of the extension. As logical definition, therefore, proposes to render the characters contained in a notion, that is, its comprehension, clear; logical division proposes to render the characters contained under an object, that is, the extension of a notion, distinct. Division is, therefore, the evolution of the extension of a notion, and it is expressed in a disjunctive proposition, of which the notion divided constitutes the subject, and the notions contained under it, the predicate. It is, therefore, regulated by the law which governs disjunctive judgments (the principle of excluded middle), although it be usually expressed in the form of a copulative categorical judgment.

The special virtue, the particular element, of perfect thinking, which Division enables us to acquire, is Distinctness, but, at the same time, it is evident that it can not accomplish this without

End of Division is Distinctness, which involves Completeness.

rendering our thinking more complete. This, however, is only a secondary and collateral result; for the problem which division proximately and principally proposes to solve is, to afford us a distinct consciousness of the extension of a given notion, through a complete or exhaustive series of subordinate or coördinate notions. This utility of Division, in rendering our knowledge more complete, is, I find, stated by Aristotle, though it has been overlooked by subsequent logicians. He observes that it is only by a regular division that we can be assured that nothing has been omitted in the definition of a thing.

As it is by means of division that we discover what are the characters contained under the notion of an object, it follows that there must be as many kinds of division possible as there are characters contained under the notion of an object,

As many kinds of Division possible as there are characters affording a Principle of Division.

which may afford the principle of a different division. If the characters which afford the principle of a division are only external and contingent, there is a division in the wider sense; if, again, they are internal and constant, there is a division in the stricter sense; if, finally, they are not only internal but also essential and original, there is a division in the strictest sense. From the very conception of logical division, it is manifest that it can only be applied where the object to be divided is a universal notion, and that it is wholly inapplicable to an individual; for as the individual contains nothing under it, consequently it is not susceptible of an ulterior division. The general problem of which division affords the solution is—To find the subordinate genera and species, the higher or generic notion being given. The higher notion is always something abstracted, something generalized from the lower notions, with which it agrees, inasmuch as it contains all that is common to these inferior concepts, and from which it differs, inasmuch as they contain a greater number of determining characters. There thus subsists an internal connection between the higher

A universal notion the only object of Logical Division.

General problem of Division.

and the lower concepts, and there is thus afforded a transition
from the superior notion to the subordinate, and, consequently,
an evolution of the lower notions from the higher. In order
to discover the inferior genera and species, we have only to
discover those characters which afford the proximate determin-
ations, by which the sphere or extension of the higher notion
is circumscribed. But to find what characters are wanted for
the thorough-going determination of a higher notion, we must
previously know what characters the higher notion actually
contains, and this knowledge is only attainable by an analysis,
a sundering of the higher notion itself. In doing this, the
several characters must be separately drawn forth and consid-
ered ; and in regard to each, we must ascertain how far it must
still be left undetermined, and how far it is capable of opposite
determinations. But whether a character be still undeterm-
ined, and of what opposite determinations it is capable, on these
points it is impossible to decide *a priori*, but only *a posteriori*,
through a knowledge of this particular character and its rela-
tions to other notions. And the accomplishment of this is
rendered easier by two circumstances; the one, that the generic
notion is never altogether abstract, but always realized and
held fast by some concrete form of imagination ; the other,
that, in general, we are more or less acquainted with a greater
or a smaller number of special notions, in which the generic
notion is comprehended, and these are able to lead us either
mediately or immediately to other subordinate concepts.

But the determinations or constituents or characters of a
notion which we seek out, must not only be completely, but also
precisely opposed. Completely, inasmuch as all the species
subordinate to the notions ought to be discovered ; and pre-
cisely, inasmuch as whatever is not a subordinate species,
ought to be absolutely excluded from the notion of the genus.

In regard to the completeness of the opposition, it is not,
however, required that the notion should be determined through
every possible contradictory opposition ; for those at least ought

to be omitted, concerning whose existence or non-existence the notion itself decides. In regard to the opposition itself, it is not required that the division should be carried through by contradictory oppositions. The only opposition necessary is the reciprocal exclusion of the inferior notions into which the higher notion is divided. In a mere logical relation, indeed, as we know nothing of the nature of a thing more than that a certain character either does or does not belong to it, a strictly logical division can only consist of two contradictory members, for example—that angles are either *righ'* or *not right*—that men are either *white* or *not white*. But looking to the real nature of the thing known, either *a priori* or *a posteriori*, the division may be not only dichotomous but polytomous, as for example—*angles are right, or acute, or obtuse; men are white, or black, or copper-colored, or olive-colored*, etc.

We now come, in the second place, to the
Rules of Logical Division. rules dictated for Logical Division.

These Rules spring either, 1°. From the Principle of Division; or, 2°. From the Relations of the Dividing Members to the Divided Whole; or, 3°. From the Relations of the several Dividing Members to each other; or, 4°. From the relations of the Divisions to the Subdivisions.

The first of these heads—the Principle of Division—comprehends the three first rules. Of these the
Those springing, I. From the Principle of Division. First Rule. first is self-evident—There must be some principle, some reason, for every division; for otherwise there would be no division determined, no division carried into effect.

In regard to the second rule—That every division should have only a single principle—the propriety
Second. of this is likewise sufficiently apparent. In every division we should depart from a definite thought, which has reference either to the notion as a unity, or to some single character. On the contrary, if we do not do this, but carry on the process by different principles, the series of notions in

which the division is realized is not orderly and homogeneous, but heterogeneous and perplexed.

The Third rule—That the principle of division should be an actual and essential character of the divided notion—is not less manifest. As the ground of division is that which principally regulates the correctness of the whole process, that is, the completeness and opposition of the division—it follows that this ground must be of notoriety and importance, and accommodated to the end for the sake of which the division is instituted. Those characters of an object are best adapted for a division, whose own determinations exert the greatest influence on the determinations of other characters, and, consequently, on those of the notion itself; but such are manifestly not the external and contingent, but the internal and essential, characters, and, of these, those have the preëminence through whose determination the greater number of others are determined, or, what is the same thing, from which, as fundamental and original attributes, the greater number of the others are derived. The choice of character is, however, for the most part, regulated by some particular end; so that, under certain circumstances, external and contingent characters may obtain a preponderant importance. Such ends can not, however, be enumerated. The character affording the principle of division must likewise be capable of being clearly and definitely brought out; for unless this be possible, we can have no distinct consciousness of the completeness and contrast of the determination of which it is susceptible. We ought, therefore, always to select those characters for principles of division, which are capable of a clear and distinct recognition.

The second part of the rule—That the division be not, therefore, too complex, and without a purpose—is a corollary of the first. In dividing, we may go on to infinity. For while, as was formerly shown, there is, in the series of higher and lower notions, no one which can be conceived as absolutely

the lowest; so in subdividing, there is no necessary limit to the process. In like manner, the coördinations may be extended *ad infinitum*. For it is impossible to exhaust all the possible relations of notions, and each of these may be employed as the principle of a new division. Thus we can divide men by relation to their age, to their sex, to their color, to their stature, to their knowledge, to their riches, to their rank, to their manner of life, to their education, to their costume, etc., etc. It would, however, be ridiculous, and render the divisions wholly useless, if we multiplied them in this fashion without end. We, therefore, intentionally restrict them, that is, we make them comparatively limited, inasmuch as we only give them that completeness which is conducive to a certain end. In this manner, divisions become relatively useful, or acquire the virtue of adaptation. In the selection of a principle of division, we must take heed whether it be fertile and pertinent. A ground of division is fertile, when it affords a division out of which again other important consequences may be drawn; it is pertinent, when these consequences have a proximate relation to the end, on account of which we were originally induced to develop the extension of a concept. A principle of division may, therefore, be useful with one intent, and useless with another. *Soldiers*, for example, may be conveniently divided into *cavalry* and *infantry*, as this distinction has an important influence on their determination as soldiers. But in considering man in general and his relations, it would be ludicrous to divide men into *foot* and *horsemen;* while, on the contrary, their division would be here appropriate according to principles which in the former case would have been absurd.

Seneca says well—'Quicquid in majus crevit facilius agnoscitur, si discessit in partes; quas innumerabiles esse et parvas non oportet. Idem enim vitii habet nimia, quod nulla divisio. Simile confuso est, quicquid usque in pulverem sectum est.'

Under the second head, that is, as springing from the rela-
tions of the Dividing Members to the Divi-

II. From the rela-
tions of the Dividing
Members to the Divid-
ed Wholes. Fourth.

ded Wholes, there are included the fourth
and fifth laws. As the notion and the
notions into which it is divided stand to each
other in the relation of whole and parts, and
as the whole is greater than the part, the fourth rule is mani-
festly necessary, viz., That no dividing member of the predi-
cate must by itself exhaust the subject. When this occurs,
the division is vicious, or, more properly, there is no division.
Thus the division of *man* into *rational animals* and *uncultivated
nations*, would be a violation of this law.

On the other hand, as the notions into which a notion is
divided, stand to each other in the relation

Fifth.

of constituting parts to a constituted whole,
and as the whole is only the sum of all the parts, the necessity
of the fifth rule is manifest—That the dividing members of
the predicate, taken together, must exhaust the subject. For
if this does not take place, then the division of the principal
notion has been only partial and imperfect. We transgress this
law, in the first place, when we leave out one or more members
of division; as for example—*The actions of men are either
good or bad*—for to these we should have added *or indifferent*.
And in the second place, we transgress it when we coördinate
a subdivision with a division; as for example—*Philosophy is
either theoretical philosophy or moral philosophy:* here the
proper opposition would have been *theoretical philosophy* and
practical philosophy. On the other hand, the dividing mem-
bers, taken together, must not do more than exhaust the sub-
ject. The definition of the whole must apply to every one of
its parts, but this condition is not fulfilled if there be a divid-
ing member, too much, that is, if there be a notion brought as
a dividing member, which, however, does not stand in subordina-
tion to the divided whole. For example—*Mathematical figures
are either solids or surfaces* (*or lines or points*). Here the last
two members (*lines and points*) are redundant and erroneous, for

lines and points, though the elements of mathematical figures, are not themselves figures.

Under the third head, as springing from the relations of the several Dividing Members to Each Other, there is a single law—the sixth—which enjoins—That the dividing members be reciprocally exclusive.

As a division does not present the same but the different determinations of a single notion (for other-
III. From the rela- wise one and the same determination would
tions of the several be presented twice), the dividing members
Dividing Members to must be so constituted that they are not
each other. Sixth. mutually coincident, so that they either in whole or in part contain each other. This law is violated when, in the first place, a subdivision is placed above a division, as, *Philosophy is either theoretical philosophy, or moral philosophy, or practical philosophy;* here *moral philosophy* falls into *practical philosophy* as a subordinate part; or when, in the second place, the same thing is divided in different points of view, as, *Human actions are either necessary, or free, or useful, or detrimental.*

Under the fourth and last head, as arising from the relations of the Divisions to the Subdivisions, there is
IV. From the rela- contained one law, the seventh, which pre-
tions of the Divisions scribes, That the divisions proceed continu-
to the Subdivisions. ously from immediate to mediate differences
Seventh. (*Divisio ne fiat per saltum vel hiatum*).

As divisions originate in the character of a notion, capable of an opposite determination, receiving this determination, and as the subdivisions originate in these opposite determinations being themselves again capable of opposite determinations, in which gradual descent we may proceed indefinitely onward; from this it is evident, that the divisions should, as far as possible, be continuous, that is, the notion must first be divided into its proximate, and then into its remoter parts, and this without overleaping any one part; or, in other words, each part must be immediately subordinated to its whole. Thus, when

some of the ancients divided *philosophy* into *rational, and natural, and moral,* the first and second members are merely subdivisions of *theoretical philosophy,* to which *moral* as *practical philosophy* is opposed. Sometimes, however, such a spring—such a *saltus*—is, for the sake of brevity, allowed; but this only under the express condition, that the omitted members are interpolated in thought. Thus, many mathematicians say, *angles are either right, or acute, or obtuse,* although, if the division were continuous, without hiatus, it would run, *angles are either right or oblique;* and *the oblique, again, either acute or obtuse.*

SECTION II.—LOGICAL METHODOLOGY.

III.—DOCTRINE OF PROBATION.

¶ LXXXVI. When there are propositions or judgments which are not intuitively manifest, and the truth of which is not admitted, then their validity can only be established when we evolve it, as an inference, from one or more judgments or propositions. This is called *Probation, Proving,* or the *Leading of Proof (probatio, argumentatio,* or *demonstratio,* in its wider sense). A Probation is thus a series of thoughts, in which a plurality of different judgments stand to each other, in respect of their validity, in the dependence of determining and determined, or of antecedents and consequents. In every Probation there are three things to be distinguished: 1°. The Judgment to be proved (*thesis*); 2°. The Ground or Principle of Proof (*argumentum*); and, 3°. The Cogency of this principle to necessitate the connection of antecedents and consequents (*vis demonstrationis* or *nervus probandi*). From the nature of Probation, it is evident that Probation without inference is impossible; and that the Thesis to be proved and Principles of Proof stand to each other as conclusion and premises, with this difference, that, in Probation, there is a judgment (the thesis) expressly supposed, which, in the Syllogism, is not, at least necessarily, the case.

In regard to the terms here employed, it is to be noticed that the term *argumentation (argumentatio)* is applied not only to a reasoning of many syllogisms, but likewise to a reasoning of one. The term *argument (argumentum)* in like manner is employed not only for the

ground of a consecutive reasoning, but for the middle term of a single syllogism. But it is, moreover, vulgarly employed for the whole process of argumentation.

The term *demonstration (demonstratio)* is used in a looser

Demonstration.

and in a stricter signification. In the former sense, it is equivalent to *probation,* or *argumentation in general;* in the latter, to *necessary probation,* or *argumentation from intuitive principles.*

The expression *leading of proof* might, perhaps, be translated

Leading of Proof of two sorts.

by the term *deduction,* but then this term must be of such a latitude as to include induction, to which it is commonly opposed ; for Probation may be either a process of Deduction, that is, the leading of proof out of one higher or more general proposition, or a process of Induction, that is, the leading of proof out of a plurality of lower or less general judgments.

To prove, is to evince the truth of a proposition not admitted

Probation in general.

to be true, from other propositions the truth of which is already established. In every probation there are three things to be distinguished : 1°. The Proposition to be proved—the Thesis ; 2°. The Grounds or Principle of Proof—the Argument ; and, 3°. The Degree of Cogency with which the thesis is inferred by the argumentum or argumenta—the *vis* or *nervus probandi.* All probation is thus syllogistic ; but all syllogism is not probative. The

How distinguished from Syllogism.

peculiarity of probation consists in this—that it expressly supposes a certain given proposition, a certain thesis, to be true ; to the establishment of this proposition the proof is relative ; this proposition constitutes the conclusion of the syllogism, or series of syllogisms, of which the probation is made up ; whereas, in the mere syllogistic process, this supposition is not

Whereon depends the logical value of a probation.

necessarily involved. It is also evident that the logical value of a probation depends, 1°. On the truth of its principles or argumenta ; 2°. On their connection with each other, and

with the thesis or proposition to be proved; and, 3°. On the logical formality of the inference of the thesis from its argumenta. No proposition can be for another the principle of proof, which is not itself either immediately or mediately certain. A proposition is immediately certain, or evident at first hand, when, by the very nature of thought, we can not but think it to be true, and when it, therefore, neither requires nor admits of proof. A proposition is mediately certain, or evident at second hand, when it is not at once and in itself thought as necessarily true, but when we are able to deduce it, with a consciousness of certainty, from a proposition which is evident at first hand. The former of these certainties is called *self-evident, intuitive, original, primary, ultimate*, etc., and the latter, *demonstrative, derivative, secondary*, etc.

According to this distinction, the Ground or Principle of Proof is either an absolute or a relative. Absolute, when it is an intuitive; relative, when it is a demonstrative proposition. That every proposition must ultimately rest on some intuitive truth, on some judgment at first hand, is manifest, if the fact of probation itself be admitted; for otherwise the regress would extend to infinity, and all probation, consequently, be impossible. When, for example, in the series of grounds H, G, F, E, D, C, B, there is no ultimate or primary A, and when, consequently, every A is only relatively, in respect of the consequent series, but not absolutely and in itself, first; in this case, no sufficient and satisfactory probation is possible, for there always remains the question concerning a still higher principle. But positively to show that such primary judgments are actually given, is an exposition which, as purely metaphysical, lies beyond the sphere of Logic.

To the general form of a system of Proof belong the following distinctions of propositions, to which I formerly alluded, and which I may again recall to your remembrance. Propositions

are either *Theoretical* or *Practical.* Practical, when they

enounce the way in which it is possible to effectuate or produce something; Theoretical, when they simply enunciate a truth, without respect to the way in which this may be realized or produced.

A Theoretical proposition, if a primary or intuitive principle, is styled an *Axiom.* Examples of this are given in the four Fundamental Laws of Logic, and in the mathematical common notions—*The whole is greater than its part*—*If equals be added to equals, the wholes are equal,* etc. A Practical proposition, if a primary or intui-

tive principle, is styled a *Postulate.* Thus Geometry postulates the possibility of drawing lines—of producing them *ad infinitum,* of describing circles, etc.

A Theoretical proposition, if mediate and demonstrable, is

called a *Theorem.* This is laid down as a *Thesis*—as a judgment to be proved—and is proved from intuitive principles, theoretical and practical. . A

Practical proposition, if mediate and demonstrable, is called a *Problem.* In the probation, the Problem itself is first enounced; it is then shown in the solution how that which is required is to be done—is to be effected; and, finally, in the proof, it is demonstrated that through this procedure the solution of the problem is obtained. For example, in the geometrical problem—to describe an equilateral triangle on a given straight line—there this problem is first stated; the solution then shows that, with this given line as a semi-diameter, we are to describe from each of its points of termination a circle; the two circles will intersect each other, and we are then, from the point of intersection, to draw straight lines to each point of termination; this being done, the proof finally demonstrates that these circles must intersect each other, that the drawn straight lines necessarily constitute a triangle, and that this triangle is necessarily equilateral.

Corollaries or *Consectaries* are propositions which, as flowing

immediately as collateral results of others, require no separate proof. *Empeiremata* or *Empirical Judgments* are propositions, the validity of which reposes upon observation and experience.

Scholia or *Comments* are propositions which serve only for illustration. *Lemmata* or *Sumptions* are propositions, borrowed either from a different part of the system we treat of, or from sciences other than that in which we now employ them.

Finally, *Hypotheses* are propositions of two different significations. For, in the first place, the name is sometimes given to the arbitrary assumption or choice of one out of various means of accomplishing an end; when, for example, in the division of the periphery of the circle, we select the division into three hundred and sixty degrees, or when, in Arithmetic, we select the decadic scheme of numeration. But, in the second place, the name of *hypothesis* is more emphatically given to provisory suppositions, which serve to explain the phenomena in so far as observed, but which are only asserted to be true, if ultimately confirmed by a complete induction. For example, the supposition of the Copernican solar system in Astronomy.

Now these various kinds of propositions are mutually concatenated into system by the Leading of Proof—by Probation.

So much for the character of this process in general. The paragraph already dictated contains a summary of the various particular characters by which Probations are distinguished. Before considering these in detail, I shall offer some preparatory observations.

The differences of Probations are dependent partly on their Matter, and partly on the form in which they are expressed.

In respect of the former ground of difference—the Matter—Probations are distinguished into Pure or *a priori*, and into Empirical or *a posteriori*, according as they

Marginal notes:

Corollaries. Empeiremata.

Scholia. Lemmata.

Hypotheses.

The differences of Probations depend partly on their Matter and partly on their Form.

1. In respect of their Matter, Probations are Pure and Empirical.

are founded on principles which we must recognize as true, as constituting the necessary conditions of all experience, or which we do recognize as true, as particular results given by certain applications of experience. In respect of the latter ground of difference—the Form —Probations fall into various classes according to the difference of the form itself, which is either an External or an Internal.

2. In respect of their Form.

In relation to the Internal Form, probations are divided into Direct or Ostensive and into Indirect or Apagogical, according as they are drawn from the thing itself or from its opposite, in other words, according as the principles of probation are positive or are negative. Under the same relation of Internal Form, they are also distinguished by reference to their order of procedure—this order being either Essential or Accidental. The essential order of procedure regards the nature of the inference itself, as either from the whole to the part, or from the parts to the whole. The former constitutes the Deductive Probation, the latter Inductive. The accidental order of procedure regards only our point of departure in considering a probation. If, commencing with the highest principle, we descend step by step to the conclusion, the process is Synthetic or Progressive; here the conclusion is evolved out of the principle. If, again, starting from the conclusion, we ascend step by step to the highest principle, the process is Analytic or Regressive; here the principle is evolved out of the conclusion.

(a) In relation to the Internal Form, Probations are direct or Ostensive and Indirect or Apagogical.

Synthetic or Progressive and Analytic or Regressive.

In respect to the External Form, Probations are Simple or Monosyllogistic, if they consist of a single reasoning, Composite or Polysyllogistic if they consist of a plurality of reasonings. Under the same relation of external form, they are also divided into Regular and Irregular, into Perfect and Imperfect.

(b) External Form. Probations are Simple and Composite.

Regular and Irregular. Perfect and Imperfect.

Another division of Probations is by reference to their Cogency, or the Degree of Certainty with which their inference is drawn. But their cogency is of various degrees, and this either objectively considered, that is, as determined by the conditions of the proof itself, or sub-jectively considered, that is, by reference to those on whom the proof is calculated to operate conviction. In the former, or objective relation, probations are partly Apodictic, or Demonstrative in the stricter sense of that term—when the certainty they necessitate is absolute and complete, that is, when the opposite alternative involves a contradiction; partly Probable—when they do not produce an invincible assurance, but when the evidence in favor of the conclusion preponderates over that which is opposed to it. In the latter or subjective relation, probations are either Universally Valid, when they are cal-culated to operate conviction on all reasonable minds, or Par-ticularly Valid, when they are fitted to convince only certain individual minds.

3. According to their degree of Cogency, Probations are Apodic-tic and Probable.

Universally and Particularly Valid.

¶ LXXXVII. Probations are divided by reference to their Matter, to their Form, and to their Degree of Cogency.

LXXXVII. Proba-tions, their Divisions.

In relation to their Matter, they are partly *Pure* or *a priori*, partly *Empirical* or *a posteriori*.

As to their Form—this is either Internal or External. In respect to their Internal Form, they are, 1°. By reference to the Manner of Inference, *Direct* or *Ostensive* (δειχτιχαί, *ostensivœ*), and *Indirect* or *Apagogical* (*probationes apagogicœ reductiones ad absurdum*); 2°. By reference to their Essential or Internal Order of Procedure, they are either *Deductive* or *Inductive;* 3°. By reference to their Accidental or External Order of Procedure, they are partly *Synthetic* or *Progressive,* partly *Analytic* or *Regressive.* In respect to their External Form, they are, 1°. *Simple* or *Monosyllogistic,* and *Composite*

or *Polysyllogistic;* 2°. *Perfect* and *Imperfect;* 3°. *Regular*
and *Irregular.*

In respect to their Degree of Cogency, they are, 1°. As
objectively considered, either *Apodictic* or *Demonstrative* in
the stricter signification of the term (ἀπόδειξεις, *demonstra-
tiones stricte dictæ*), or *Probable* (*probationes sensu latiori*);
2°. As subjectively considered, they are either *Universally
Valid* (κατ' ἀληθείαν, *secundum veritatem*), or *Particularly
Valid* (κατ' ἄνθρωπον, *ad hominem*).

To speak now of these distinctions in detail. In the first

Explication.

Probations, 1. In re-
spect of their Matter,
are Pure and Empiri-
cal.

place, Probations, we have said, in relation
to their matter, are divided into Pure or *a
priori*, and into Empirical or *a posteriori.*
Pure or *a priori* proofs are those that rest on
principles which, although rising into con-
sciousness only on occasion of some external or internal observ-
ation, of some act of experience, are still native, are still
original, contributions of the mind itself, and a contribution
without which no act of experience becomes possible. Proofs
again are called *Empirical* or *a posteriori,* if they rest on prin-
ciples which are exclusively formed from experience or observ-
ation, and whose validity is cognizable in no other way than
that of experience or observation. When the principles of
Probation are such as are not contingently given by experience,
but spontaneously engendered by the mind itself, these princi-
ples are always characterized by the qualities of necessity and
universality; consequently, a proof supported by them is ele-
vated altogether above the possibility of doubt. When, on the
other hand, the Principles of Probation are such as have only
the guaranty of observation and experience for their truth—
(supposing even that the observation be correct and the experi-
ence stable and constant)—these principles, and, consequently,
the probation founded on them, can . pretend neither to neces-
sity nor universality; seeing that what produces the observa-
tion or experience has only a relation to individual objects, and

is only competent to inform us of what now is, but not of what always is, of what necessarily must be. Although, however, these empirical principles are impressed with the character neither of necessity nor of universality, they play a very important part in the theater of human thought. This distinction of Proofs, by reference to the matter of our knowledge, is one, indeed, which Logic does not

This distinction of Probations not taken into account by Logic. take into account. Logic, in fact, considers every inference of consequent from an antecedent as an inference *a priori*, supposing even that the antecedents themselves are only of an empirical character. Thus we may say, that, from the general relations of distance found to hold between the planets, Kant and Olbers proved *a priori* that between Mars and Jupiter a planetary body must exist, before Ceres, Pallas, Juno, and Vesta, were actually discovered. Here, however, the *a priori* principle is in reality only an empirical rule—only a generalization from experience. But with the manner in which these empirical rules—(Bacon would call them *axioms*)—are themselves discovered or evolved, with this, Pure Logic has no concern.

In the second place, in respect of their Form, and that the Internal, Probations are, as we said, first of

2. In respect of their Form—(a) Direct and Indirect. all, divided into Direct or Ostensive, and into Indirect or Apagogical. A proof is Direct or Ostensive, when it evinces the truth of a thesis through positive principles, that is, immediately; it is Indirect or Apagogical, when it evinces the truth of a thesis through the falsehood of its opposite, that is, mediately. The indirect is especially called the *apagogical* (*argumentatio apagogica* sive *deductio ad impossibile*), because it shows that something can not be admitted, since, if admitted, consequences would necessarily follow impossible or absurd. The indirect or Apagogical mode of proof is established on the principle, that that must be conceded to be true whose

Principle of Indirect proof. contradictory opposite contains within itself a contradiction. This principle manifestly

rests on the Law of Contradiction, and on the Law of Excluded
Middle ; for what involves a contradiction it is impossible for
us to think, and if a character must be denied of an object—
that it must be so denied the probation has to show, then the
contradictory opposite of that character is of necessity to· be
affirmed of that object.   The Direct mode of probation has
undoubtedly this advantage over the Indirect—that it not only
furnishes the sought-for truth, but also truly develops its
necessary connection with its ultimate principles ; whereas the
Indirect demonstrates only the repugnance of some proposition
with certain truths, without, however, positively evincing the
truth of its opposite, and thereby obtaining for it a full and
satisfactory recognition.   It is, therefore, usually employed
only to constrain a troublesome opponent to silence, by a dis-
play of the absurdities which are implied in, and which would
flow out of, his assertions.   Nevertheless, the indirect probation
establishes the proposition to be proved not less certainly than
the direct ; nay, it still more precisely excludes the supposition
of the opposite alternative, and, consequently, affords an
intenser consciousness of necessity.   We ought, however, to
be on our guard against the paralogisms to which it is pecu-
liarly exposed, by taking care—1°. That the opposites are
contradictory and not contrary ; and 2°. That an absurdity
really is, and not merely appears to be.   The differences of
Apagogical Probations correspond to the
Differences of Indi-
rect or Apagogical
Probations. different kinds of propositions which may be
indirectly demonstrated ; and these are, in
their widest generality, either Categorical, or
Hypothetical, or Disjunctive.   Is the thesis a categorical prop-
osition ?   Its contradictory opposite is supposed, and from this
counter proposition conclusions are deduced, until we obtain
one of so absurd a character, that we are able to argue back to
·the falsehood of the original proposition itself.   Again, is
the thesis a hypothetical judgment ?   The contrary opposite
of the consequent is assumed, and the same process to the

same end is performed as in the case of a categorical proposition. Finally, is the thesis a disjunctive proposition? In that case, if its *membra disjuncta* are contradictorily opposed, we can not, either directly or indirectly, prove it false as a whole; all that we can do being to show that one of these disjunct members can not be affirmed of the subject, from which it necessarily follows that the others must.

Under the Internal Form, Probations are, in the second

(b) Deductive and Inductive.

place, in respect of their Essential or Internal Order of procedure either Deductive or Inductive, according as the thesis is proved by a process of reasoning descending from generals to particulars and individuals, or by a process of reasoning ascending from individuals and particulars to generals.

Under the Internal Form, Probations are, in the third place,

(c) Synthetic and Analytic.

in respect of their External or Accidental Order of procedure, Synthetic or Progressive, and Analytic or Regressive. A probation is called *synthetic* or *progressive*, when the conclusion is evolved out of the principles; *analytic* or *regressive*, when the principles are evolved out of the conclusion. In the former case, the probation goes from the subject to the predicate; in the latter case, from the predicate to the subject. Where the probation is complex, if synthetic, the conclusion of the preceding syllogism is the subsumption of that following; if analytic, the conclusion of the preceding syllogism is the sumption of that following. In respect of certainty, both procedures are equal, and each has its peculiar advantages; in consequence of which the combination of these two modes of proof is highly expedient. But the Analytic Procedure is often competent where the Synthetic is not; whereas the Synthetic is never possible where the Analytic is not, and this is never possible where we have not a requisite stock of propositions already verified. When the Probation is partly analytic, partly synthetic, it is called *Mixed*.

¶ LXXXVIII. The Formal Legitimacy of a Probation is determined by the following rules.

LXXXVIII. Formal Legitimacy of a Probation, its Rules. 1°. Nothing is to be begged, borrowed, or stolen; that is, nothing is to be presupposed as proved, which itself requires a demonstration. The violation of this rule affords the vice called the *Petitio principii*, or *Fallacia quæsiti medii* (τὸ ἐν ἀρχῇ αἰτεῖσθαι).

2°. No proposition is to be employed as a principle of proof, the truth of which is only to be evinced as a consequence of the proposition which it is employed to prove. The violation of this rule is the vice called ὕστερον πρότερον.

3°. No circular probation is to be made; that is, the proposition which we propose to prove must not be used as a principle for its own probation. The violation of this rule is called the *Orbis vel circulus in demonstrando* — *diallelus* — ὁ δι' ἀλλήλων τρόπος.

4°. No leap, no hiatus, must be made; that is, the syllogisms of which the probation is made up must stand in immediate or continuous connection. From the transgression of this rule results the vice called the *Saltus* vel *Hiatus in demonstrando*.

5°. The scope of the probation is not to be changed; that is, nothing is to be proved other than what it was proposed to prove. The violation of this rule gives the *Heterozetesis*, *Ignoratio* vel *Mutatio elenchi*, and the *Transitus in aliud genus* vel *a genere ad genus*—μετάβασις εἰς ἄλλο γένος.

In this paragraph, I have given, as different rules, those canons which are opposed to vices not absolutely identical, and which have obtained different denominations. But you must observe, that the first three rules are all manifestly only various modifications—only special cases—of one general law. To this law, likewise, the fourth rule may with perfect propriety be

These rules reduced to two.

reduced, for the *saltus* or *hiatus in probando* is, in fact, no less the assumption of a proposition as a principle of probation which itself requires proof, than either the *petitio principii*, the *hysteron proteron*, or the *circulus in probando*. These five laws, therefore, and the correspondent vices, may all be reduced to two; one of which regards the means, the principles of proof; the other the end, the proposition to be proved.. The former of these laws prescribes—That no proposition be employed as a principle of probation which stands itself in want of proof; the latter—That nothing else be proved than the proposition for whose proof the probation was instituted. You may, therefore, add to the last paragraph the following supplement:

¶ LXXXIX. These rules of the logicians may, however, all be reduced to two.

LXXXIX. Rules of Probation reduced to two.

1°. That no proposition be employed as a Principle of Probation which stands itself in need of proof.

2°. That nothing else be proved than the Proposition for whose proof the Probation was instituted.

Explication.

Of these two, the former comprehends the first four rules of the logicians, the latter the fifth. I shall now, therefore, proceed to illustrate the five rules in detail.

The first Rule—Nothing is to be begged, borrowed, or stolen; that is, nothing is to be presupposed as proved, which itself requires a demonstration—is, in fact, an enunciation of the first general rule I gave you, and to this, therefore, as we shall see, the second, third, and fourth are to be reduced as special applications. But, in considering this law in its universality, it is not to be understood as if every probation were at once to be rejected as worthless, in which anything is presupposed and not proved. Were this its sense,

First Rule.

Limitation under which this Rule is to be understood.

it would be necessary in every probation to ascend to the highest principles of human knowledge, and these themselves, as immediate and, consequently, incapable of proof might be rejected as unproved assumptions. Were this the meaning of the law, there could be no probation whatever. But it is not to be understood in this extreme rigor. That probation alone is a violation of this law, and, consequently, alone is vicious, in which a proposition is assumed as a principle of proof, which may be doubted on the ground on which the thesis itself is doubted, and where, therefore, we prove the uncertain by the equally uncertain. The probation must, therefore, depart from such principles as are either immediately given as ultimate, mediately admit of a proof from other sources than the proposition itself in question. When, for example, it was argued that the Newtonian theory is false, which holds colors to be the result of a diversity of parts in light, on the ground, admitted by the ancients, that the celestial bodies, and, consequently, their emanations, consist of homogeneous elements; this reasoning was inept, for the principle of proof was not admitted by modern philosophers. Thus, when Aristotle defends the institution of slavery as a natural law, on the ground that the barbarians, as of inferior intellects, are the born bondsmen of the Greeks, and the Greeks, as of superior intellects, the born masters of the barbarians—(an argument which has, likewise, been employed in modern times in the British Parliament, with the substitution of negroes for barbarians, and whites for Greeks)—this argument is invalid, as assuming what is not admitted by the opponents of slavery. It would be a *petitio principii* to prove to the Mohammedan the divinity of Christ from texts in the New Testament, for he does not admit the authority of the Bible; but it would be a valid *argumentum ad hominem* to prove to him from the Koran the prophetic mission of Jesus, for the authority of the Koran he acknowledges.

The Second Rule, That no proposition is to be employed as

a principle of proof, the truth of which is only to be evinced

as a consequence of the proposition which it is employed to prove—is only a special case of the preceding. For example, if we were to argue that man is a free agent, on the ground that he is morally responsible for his actions, or that his actions can be imputed to him, or on the ground that vice and virtue are absolutely different— in these cases, the *hysteron proteron* is committed ; for only on the ground that the human will is free, can man be viewed as a morally responsible agent, and his actions be imputed to him, or can the discrimination of vice and virtue, as more than a merely accidental relation, be maintained. But we must pause before we reject a reasoning on the ground of *hysteron proteron* ; for the reasoning may still be valid, though this logical fault be committed. Nay, it is frequently necessary for us to reason by such a regress. In the very example given, if we be unable to prove directly that the will of man is free, but are able to prove that he is a moral agent, responsible for his actions, as subjected to the voluntary but unconditional Law of Duty, and if the fact of this law of duty and its unqualified obligation involve, as a postulate, an emancipation from necessity—in that case no competent objection can be taken to this process of reasoning. This, in fact, is Kant's argument. From what he calls the *categorical imperative*, that is, from the fact of the unconditional law of duty as obligatory on man, he postulates, as conditions, the liberty of the human will, and the existence of a God, as the moral governor of a moral universe.

The Third Law—That no circular probation is to be made,

that is, the proposition which we propose to prove must not be used as a principle for its own probation—this, in like manner, is only a particular case of the first. To the Circle there are required properly two probations, which are so reciprocally related that the antecedent in the one is proved by its own consequent in the other.

The proposition A is true because the proposition B is true; and the proposition B is true because the proposition A is true. A circle so palpable as this would indeed be committed by no one. The vice is usually concealed by the interpolation of intermediate propositions, or by a change in the expression. Thus Plato, in his *Phædo*, demonstrates the immortality of the soul from its simplicity; and, in the *Republic*, he demonstrates its simplicity from its immortality.

In relation to the Hysteron Proteron and the Circle, I must observe that these present some peculiar dif-

Regressive and Progressive Proofs not to be confounded with the tautological Circle.

ficulties for the systematic arrangement of our knowledge. Through the Circle (the result of which is only the proof of an assertion) — through the circle by itself, nothing whatever is gained for the logical development of our knowledge. But we must take care not to confound the connection of Regressive and Progressive Proofs with the tautological Circle. When, in the treatment of a science out of the observed facts, we wish to generalize universal laws, we lead, in the first place, an inductive probation, that (ὅτι) certain laws there are. Having assured ourselves of the existence of these laws by this regressive process, we then place them in theory at the head of a progressive or synthetic probation, in which the facts again recur, reversed and illustrated from the laws, which, in the antecedent process, they had been employed to establish; that is, it is now shown why (διότι) these facts exist.

The Fourth Rule—No leap, no gap, must be made, that is,

Fourth Rule.

the syllogisms of which the probation is made up must stand in immediate or continuous connection—may be, likewise, reduced to the first. For here the only vice is that, by an ellipsis of an intermediate link in the syllogistic chain, we use a proposition which is actually without its proof, and it is only because this proposition is as yet unproved, that its employment is illegitimate. The *Saltus* is, therefore, only a special case of the *Petitio*.

The *Saltus* is committed when the middle term of one of the syllogisms in a probation is not stated. If the middle term be too manifest to require statement, then is the *saltus* not to be blamed, for it is committed only in the expression and not in the thought. If the middle term be not easy of discovery, then the *saltus* is a fault; but if there be no middle term to be found, then the *saltus* is a vice which invalidates the whole remainder of the probation. The proper *saltus*—the real violation of this law, is, therefore, when we make a transition from one proposition to another, the two not being connected together as reason and consequent. The (vulgar) Enthymeme and the Sorites do not, therefore, it is evident, involve violations of this law.

The Saltus in demonstrando.

The Fifth Rule—The scope of the probation is not to be changed, that is, nothing is to be proved other than what was proposed to be proved, corresponds to the second of the two rules which I gave, and of which it is only a less explicit statement. It evidently admits of three kinds or degrees. In the first case, the proposition to be proved is changed by the change of its subject or predicate into different notions. Again, the proposition may substantially remain the same, but may be changed into one either of a wider or of a narrower extension—the second and third cases.

Fifth Rule. Admits of three degrees.

The first of these cases is the *Mutatio Elenchi*, or *Transitus ad aliud genus*, properly so called. When a probation does not demonstrate what it ought to demonstrate, it may, if considered absolutely or in itself, be valid; but if considered relatively to the proposition which it behooves us to prove, it is of no value. We commute by this procedure the whole scope or purport of the probation; we desert the proper object of inquiry—the point in question. If a person would prove the existence of ghosts, and to this end prove by witness the fact of unusual noises and appearances during the night, he would prove some-

First Degree—Mutatio Elenchi.

thing very different from what he proposed to establish; for this would be admitted without difficulty by those who still denied the apparition of ghosts; it, therefore, behooves him to show that the unusual phenomena were those of a spirit good or bad.

The two other cases—when the proposition actually proved is either of a smaller or of a greater extension

Second Degree — in which too little is proved. than the proposition which ought to have been proved—are not, necessarily, like the preceding, altogether irrelevant. They are, however, compared together, of various degrees of relevancy. In the former case, where too little is proved—here the end proposed is, to a certain extent at least, changed, and the probation results in something different from what it was intended to accomplish. For example, if we propose to prove that Sempronius is a virtuous character, and only prove the legality of his actions, we here prove something less than, something different from, what we professed to do; for we proposed to prove the internal morality, and not merely the external lawfulness, of his conduct. Such a proof is not absolutely invalid; it is not even relatively null, for the external legality is always a concomitant of internal morality. But the existence of the latter is not evinced by that of the former, for Sempronius may conform his actions to the law from expediency and not from duty.

In the other case, in which there is proved too much, the probation is lawful, and only not adequate

Third Degree — in which too much is proved. and ·precise. For example, if we propose to prove that the soul does not perish with the body, and actually prove that its dissolution is absolutely impossible, here the proof is only superabundant. The logical rule, *Qui nimium probat, nihil probat*, is, therefore, in its universal or unqualified expression, incorrect. The proving too much is, however, often the sign of a *saltus* having been committed. For example, when a religious enthusiast

argues from the strength of his persuasion, that he is, there-
fore, actuated by the Holy Spirit, and his views of religion
consequently true, there is here too much proved, for there is
implied the antecedent, omitted by a saltus, that whoever is
strongly persuaded of his inspiration is really inspired, a prop-
osition too manifestly absurd to bear an explicit enouncement.
In this case, the apparent too much is in reality a too much
which, when closely examined, resolves itself into a nothing.

APPENDIX.

APPENDIX A.

HERE, I may observe, that as you obtain no information from Dr. Whately in regard to the primary laws of thought—these laws being in fact apparently unknown to every British logician, old or new— so you will find but little or no aid from his *Elements* toward an understanding of the doctrine of concepts. His omission, in this respect, can not be excused by his error in regard to the object-matter of Logic; that object, you will recollect, being on his view, or rather one of his views, not thought in general, or the products of the comparative faculty in their three degrees, but reasoning or argumentation alone; for even on the hypothesis that Logic is thus limited, still, as the doctrine of reasoning can only be scientifically evolved out of the doctrine of concepts, the consideration of the latter forms the indispensable condition of a satisfactory treatment of the former. But not only is Whately's doctrine of concepts, or, in his language, of "the process of simple apprehension," meager and imperfect, it is even necessary to forewarn you that it leads to confusion and error. There is a fundamental distinction of what is called the *Extension* and the *Comprehension* of notions—a distinction which, in fact, as you will find, forms the very cardinal point on which the whole theory of Logic turns. But not only is this distinction not explained, it is not even articulately stated; nay, the very words which logicians have employed for the expression of this contrast, are absolutely used as synonymous and convertible. Instead, therefore, of referring you for information in regard to our present object of consideration, to Dr. Whately, I am sorry to be compelled to caution you against putting confidence in his guidance.

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APPENDIX B.

In the formation of a concept or notion, the process may be analyzed into four momenta. In the first place, we must have a plurality of objects presented or represented by the subsidiary faculties. These faculties must furnish the rude material for elaboration. In the second place, the objects thus supplied are, by an act of the Understanding, compared together, and their several qualities judged to be similar or dissimilar. In the third place, an act of volition, called Attention, concentrates consciousness on the qualities thus recognized as similar; and that concentration, by attention on them, involves an abstraction of consciousness from those which have been recognized and thrown aside as dissimilar; for the power of consciousness is limited, and it is clear or vivid precisely in proportion to the simplicity or oneness of its object. Attention and Abstraction are the two poles of the same act of thought; they are like the opposite scales in a balance—the one must go up as the other goes down. In the fourth place, the qualities, which by comparison are judged similar, and by attention are constituted into an exclusive object of thought—these are already, by this process, identified in consciousness; for they are only judged similar, inasmuch as they produce in us indiscernible effects. Their synthesis in consciousness may, however, for precision's sake, be stated as a fourth step in the process; but it must be remembered, that at least the three latter steps are not, in reality, distinct and independent acts, but are only so distinguished and stated, in order to enable us to comprehend and speak about the indivisible operation, in the different aspects in which we may consider it. In the same way, you are not to suppose that the mental sentence which must be analyzed in order to be expressed in language, has as many parts in consciousness, as it has words, or clauses, in speech; for it forms, in reality, one organic and indivisible whole. To repeat an illustration I have already given—the parts of an act of thought stand in the same relation to each other as the parts of a triangle—a figure which we can not resolve into any simpler figure, but whose sides and angles we may consider apart, and, therefore, as parts; though these are, in reality, inseparable, being the necessary conditions of each other.

APPENDIX C.

THE generality or universality of concepts is potential, not actual. They are only generals, inasmuch as they may be applied to any of the various objects they contain; but while they can not be actually elicited into consciousness, except in application to some one or other of these, so, they can not be so applied without losing, *pro tanto,* their universality. Take, for example, the concept *horse.* In so far as by *horse* we merely think of the word, that is, of the combination formed by the letters *h, o, r, s, e*—this is not a concept at all, as it is a mere representation of certain individual objects. This I only state and eliminate, in order that no possible ambiguity should be allowed to lurk. By *horse,* then, meaning not merely a representation of the word, but a concept relative to certain objects classed under it; the concept *horse,* I say, can not, if it remain a concept, that is, a universal attribution, be represented in imagination; but, except it be represented in imagination, it can not be applied to any object; and, except it be so applied, it can not be realized in thought at all. You may try to escape the horns of the dilemma, but you can not. You can not realize in thought an absolute or irrespective concept, corresponding in universality to the application of the word; for the supposition of this involves numerous contradictions. An existent *horse* is not a relation, but an extended object possessed of a determinate figure, color, size, etc.; *horse,* in general, can not, therefore, be represented, except by an image of something extended, and of a determinate figure, color, size, etc. Here now emerges the contradiction. If, on the one hand, you do not represent something extended and of a determinate figure, color, and size, you have no representation of any horse. There is, therefore, on this alternative, nothing which can be called the actual concept or image of a horse at all. If, on the other hand, you do represent something extended and of a determinate figure, color, and size, then you have, indeed, the image of an individual horse, but not a universal concept coadequate with *horse* in general. For how is it possible to have an actual represent-ation of a figure, which is not a determinate figure? but if of a determinate figure, it must be that of some one of the many different figures under which horses appear; but then, if it be only of one of these, it can not be the general concept of the others, which it does not

represent. In like manner, how is it possible to have the actual
representation of a thing colored, which is not the representation of
a determinate color, that is, either white, or black, or gray, or brown,
etc.? but if it be any one of these, it can only represent a horse of
this or that particular color, and can not be the general concept of
horses of every color. The same result is given by the other attri-
butes; and what I originally stated is thus manifest—that concepts
have only a potential, not an actual, universality; that is, they are
only universal, inasmuch as they may be applied to any of a certain
class of objects, but as actually applied, they are no longer general
attributions, but only special attributes.

APPENDIX D.

THIS word, as far as now known, was first employed by Aristotle
in a logical signification. I have already explained the meaning of
the term *category;* but you are not to suppose that *categorical* has any
reference to the ten *summa genera* of the Stagirite. By Aristotle the
term κατηγορικὸς is frequently employed, more especially in the books
of the *Prior Analytics*—and in these books alone it occurs, if I am
correct in my estimate, eighty-seven times. Now you will observe,
that in no single instance is this word applied by Aristotle, except in
one unambiguous signification, that is, the signification of *affirmative;*
and it is thus by him used as a term convertible with καταφατικὸς, and
as opposed to the two synonyms of negation he indifferently employs
ἀποφατικὸς and στερητικὸς. Such is the meaning of the word in Aris-
totelic usage. Now you will observe, that it obtained a totally differ-
ent meaning in the writings of his disciples. This new meaning it
probably obtained from Theophrastus, the immediate disciple of Aris-
totle, for by him and Eudemus we know that it was so employed;
and in this new meaning it was exclusively applied by all the Greek
and Latin expositors of the Peripatetic philosophy, in fact, by all sub-
sequent logicians without exception. In this second signification, the
term *categorical*, as applied to a proposition, denotes a judgment in
which the predicate is simply affirmed or denied of the subject, and
in contradistinction to those propositions which have been called
hypothetical and *disjunctive*. In this change of signification there is
nothing very remarkable. But it is a singular circumstance that,
though the Aristotelic employment of the word be in every instance
altogether clear and unambiguous, no one, either in ancient or in

modern times, should ever have made the observation, that the word was used in two different meanings; and that in the one meaning it was used exclusively by Aristotle, and in the other exclusively by all other logicians. I find, indeed, that the Greek commentators on the *Organon* do, in reference to particular passages, sometimes state, that κατηγορικὸς is there used by Aristotle in the signification of *affirmative*; but, in so far as I have been able to ascertain, no one has made the general observation, that the word was never applied by Aristotle in the sense in which alone it was understood by all other logical writers. So much for the meaning of the term *categorical*; as now employed for *simple* or *absolute*, and as opposed to *conditional*, it is used in a sense different from its original and Aristotelic meaning.

APPENDIX E.

THE logicians after Aristotle have distinguished two, or, as we may take it, three, or even four, species of Conversion.

1. The first, which is called *Simple* or *Pure Conversion* (*conversio simplex*, τοῖς ὅροις πρὸς ἑαυτήν, Aristotle, *i. e., cum terminis reciprocatis*), is when the quantity and quality of the two judgments are the same. It holds in Universal Negative and Particular Affirmative propositions.

2. The second, which is called *Conversion by Accident* (*c. per accidens*, ἐν μέρει, κατὰ μέρος, Aristotle), is when, the quality remaining unaltered, the quantity is reduced. It holds in Universal Affirmatives. These two are the species of the conversion of propositions acknowledged by all; they are evolved by Aristotle, not, as might have been expected, in his treatise *On Enouncement*, but in the second chapter of the first book of his *Prior Analytics*.

3. The third, which is called *Conversion by Contraposition* (*c. per oppositionem, c. per contra positionem*, both by Boethius, *contrapositio*, ἀντιστροφή σὺν ἀντιθέσει, Alexander), is when, instead of the subject and predicate, the quantity and quality remaining the same, there is placed the contradictory of each. This holds in Universal Affirmatives, and most logicians allow it in Particular Negatives. It is commemorated by Aristotle in the eighth chapter of the second book of his *Topics:* it is there called the *inverse consecution from contradictions*.

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